

DOCUMENT RESUME

ED 315 065

IR 014 302

AUTHOR Fox, James; Saunders, Catherine
TITLE Education Research and Development Centers: Major Research Findings, Selected Accomplishments, and Publications, 1985-1988.
INSTITUTION Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO OR-89-561
PUB DATE Oct 89
NOTE 202p.
PUB TYPE Reference Materials - Directories/Catalogs (132) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC09 Plus Postage.
DESCRIPTORS *Educational Development; Federal Programs; *Financial Support; *Publications; *Research and Development Centers; *Research Projects
IDENTIFIERS Department of Education

ABSTRACT

This guide provides an overview of the National Education Research and Development Centers sponsored by the Office of Research of the U.S. Department of Education. Information provided for each of 23 centers includes the nature of the center's work, its location, and the names of its principal researchers. Center listings are divided into two groups. For centers that have been in operation for at least 3 years, accomplishments, research findings, and publications are reported; for newer centers, major research areas are described. The guide is intended for three primary audiences: (1) practitioners (to locate information about recent research developments and researchers in particular fields); (2) researchers (to help coordinate collective efforts on particular topics); and (3) funders of research (to keep informed about progress of work in the areas covered by the centers). (GL)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

★ This document has been reproduced as
received from the person or organization
originating it

☐ Minor changes have been made to improve
reproduction quality

● Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy

Education Research and Development Centers

Major Research Findings, Selected Accomplishments, and Publications 1985–1988

Project Officers

**James Fox
Catherine Saunders**

**Office of Research
Office of Educational Research and Improvement**

October 1989

U.S. Department of Education

Lauro F. Cavazos

Secretary

Office of Educational Research and Improvement

Bruno V. Manno

Acting Assistant Secretary

Office of Research

Milton Goldberg

Director

Information Services

Sharon K. Horn

Acting Director

Preface

This publication provides an overview of the National Education Research and Development Centers sponsored by the Office of Research of the United States Department of Education. For each center, the book describes the nature of the institution's work, tells where the center is located, and lists the principal researchers. In addition, for the purpose of this publication, the centers are divided into two groups. For centers that have been in operation for at least three years, we report accomplishments, research findings, and publications. For the newer centers, we describe the areas of research that are being studied.

This material should be of interest to a number of audiences. First, this publication provides practitioners information about recent research developments in particular fields. Practitioners can also use this book as a reference to expert researchers in specific fields. Second, researchers themselves can use this document to help them better coordinate their collective efforts on particular topics. Third, funders of research can use this publication to gain some insight into the progress of work in the areas covered by the centers. This, in turn, helps guide decisions regarding what new work might be most productive.

The material in this book has been provided and reviewed by center liaisons at the Office of Research in the U.S. Department of Education, and by the center directors at the respective institutions. We gratefully acknowledge the input of these individuals. We should note that the relative maturity of the work reported in this document varies from center to center and from project to project. For example, some research findings are preliminary; others are well grounded on numerous replications. Readers wishing further information about particular center projects are encouraged to contact centers directly.

This publication was conceived, designed, and developed by James Fox. The material in this book was compiled by Catherine Saunders. We hope this overview is a useful guide to the work of the National Education Research and Development Centers.

TABLE OF CONTENTS

<u>Section I</u>	Page
Educational Technology Center-----	1
Center for Language Education and Research-----	15
Center for Policy Research in Education-----	33
Center for Research on Elementary and Middle Schools-----	46
Center for Research on Evaluation, Standards, and Student Testing-----	68
Center for the Study of Learning-----	77
Center for the Study of Writing-----	92
National Center for Postsecondary Governance and Finance----	100
National Center for Research on Teacher Education-----	111
National Center on Effective Secondary Schools-----	116
National Center for Research to Improve Postsecondary Teaching and Learning-----	127
National Center on Education and Employment-----	136
Reading Research and Education Center-----	150
 <u>Section II</u>	
Center for Research and Development on School Leadership-----	163
Center for Research on the Context of Secondary School Teaching-----	167
Center for Research on the Education of Disadvantaged Students-----	170
Center for School Leadership-----	174
Center for Technology in Education-----	176
Center for the Learning and Teaching of Elementary Subjects-----	178

Center for the Learning and Teaching of Literature-----	182
National Arts Education Research Center-----	184
National Center for Research in Mathematical Sciences Education-----	188
The National Center for Improving Science Education-----	191

Section I

EDUCATIONAL TECHNOLOGY CENTER

Harvard Graduate School of Education
337 Gutman Library
6 Appian Way
Cambridge, MA 02138
(617) 495-9373

Co-Directors: Judah L. Schwartz
Martha Stone Wiske

Affiliated Organizations: Cambridge, Newton, Ware, and Watertown, Massachusetts school systems; Children's Television Workshop; Education Collaborative for Greater Boston; Education Development Center; Educational Testing Service; Interactive Training Systems; and WGBH Educational Foundation.

Mission:

The Center's goal is to study ways of using the computer and other information technologies to teach for understanding in K-12 science, mathematics, and computing. Research focuses on "targets of difficulty" that were identified by subject matter experts, researchers, and teachers as topics in the curriculum that were both central to their disciplines and difficult to teach and learn. Mathematics education research focuses on word problems, geometry and algebra. Projects in all three areas use the computer's capacity to provide dynamic visual representations of mathematical ideas. Science education projects examine the use of computer-based simulations to help students learn difficult conceptual distinctions such as weight from density and heat from temperature. They also focus on students' ideas about the nature and purpose of scientific work and on teaching the process skills associated with scientific inquiry. Projects in computing education include research aimed at identifying and reducing students' difficulties in learning to program, research on the educational uses of systems modeling software, and research on how to introduce teachers and students to the use of applications software such as databases and spreadsheets. Two additional projects on emerging technologies explore the educational potential of microcomputer-based conferencing and interactive videodisc.

Programs of Research

Mathematics Education Program

Science Education Program

Principal Investigators

James J. Kaput

Susan E. Carey

Computer Education Program

David N. Perkins

New Technologies Program

Judah L. Schwartz

OERI Center Liaison: Ram Singh
Office of Research
Learning and Instruction Division
(202) 357-6032

Major Research Findings

- o Computer simulations that visually represent normally unobservable aspects of scientific phenomena can help students to change their deeply rooted everyday ideas -- sometimes referred to as alternative frameworks -- and to more readily grasp important accepted scientific theories and concepts. Through clinical interviews, researchers probed students' ideas about weight and density and heat and temperature, both to find out what young people already know and believe about these phenomena and to see how their ideas differ from the textbook theories they are expected to learn in science class. The Center then developed interactive computer-based conceptual models that explicate and represent these scientific concepts within an environment in which students can make and test hypotheses. For example, although density is unobservable in the real world -- students must infer it from their knowledge of weight and size -- the ETC Prototype Weight/Density software represents density in a visually quantifiable way.
- o Classroom studies suggest that the weight/density simulations help students to move through five predictable levels of understanding the distinction between these two concepts. Initially attending only to weight and making no distinction between weight and density, most youngsters gradually learned the differentiation, and many were able to apply it under all conditions, including thermal expansion.
- o In classroom studies of the effectiveness of Prototype Heat/Temperature software, students who used the computer models displayed a better grasp than control students of the differences between heat and temperature, especially the extensivity of heat and the intensivity of temperature. They correctly used the concept of amount of heat, their knowledge was better integrated, and they made better predictions about novel situations.

- o Students have alternative frameworks not only about particular scientific concepts but also about the construction of scientific knowledge in general. For example, researchers found that most junior high school students think the purpose of science is to discover new inventions and cures. Most have no notion of science as the intellectual construction of theories, no sense of experiments as tests of ideas, and no differentiation of hypotheses, experiments, and results. Researchers designed a curricular unit to teach students not only how to carry out controlled laboratory experiments but also to address metaconceptual points about the nature and purpose of scientific inquiry. Students who have used this curriculum learn as much as those taught by traditional means about the scientific method, and they learn more about the nature and purpose of science.

- o The computer's power as a representational medium enables the creation of a "concrete-to-abstract software ramp" that takes a longitudinally coherent approach to teaching students the web of mathematical ideas connecting the topics of rate, ratio, proportion, and intensive quantity. The software series created at ETC starts at the level of concrete icon-based calculation, then links this iconic representation of quantities with other more abstract and mathematically powerful representations such as tables of data, coordinate graphs, and algebraic equations. Originally envisioned as an environment for solving word problems, the software series now in prototype form spans several grade levels, taking students from the rudiments of multiplication, division, and ratio reasoning through pre-algebra. Results so far suggest that the external visual representations presented by the software help students to construct more sophisticated mental representations of the target mathematical ideas.

- o Computers equipped with appropriate software can permit students to build, manipulate, and learn from educationally powerful objects that are otherwise impossible or impractical in the classroom. For example, the Center has demonstrated the potential of software entitled the GEOMETRIC SUPPOSER (developed at Education Development Center and available from Sunburst Communications, Inc.) to reintroduce an empirical component into the teaching and learning of geometry. This software eliminates the tedium of compass and straightedge, enabling students to make quick, accurate geometric constructions and measurements. Because they can quickly generate large amounts of geometric data, students are able to make and test their own conjectures about geometric relationships,

rather than simply memorizing theorems and proofs in their textbooks. Studies have shown that on tests of ability to provide arguments and formulate hypotheses, students who used the Supposer within an inquiry-based approach to learning geometry were far more likely than their counterparts in traditional classes to make conjectures about large sets of cases and to provide formal proofs.

- o Students often misinterpret graphical representation of algebraic functions, and these misinterpretations sometimes lead to incorrect inferences about the relationship between graphs and functions. Using software (under development at Education Development Center) that links symbolic mathematical expressions with their graphic representations, researchers have found that issues of scale often confuse students and are now developing teaching approaches to help students overcome this confusion.
- o Beginning programming students have two principal problems. First, they have difficulty reading programs and predicting how the computer will carry them out. This weakness creates problems at all stages of the programming process, including the writing, checking, debugging, and repairing of programs. Second, students have trouble "filing" information about the programming language in a way they can use later -- that is, they have trouble putting what they have learned into practice. Having identified these difficulties, ETC researchers developed a metacourse to address them. This metacourse -- a series of lessons to be interspersed throughout the regular curriculum for a semester-long beginning course in BASIC -- stresses key concepts and mental models that teachers and students can apply to any programming task they encounter. Students who have used scripted Metacourse lessons have outperformed control students on end-of-semester tests of BASIC.
- o Connecting educational research to the improvement of practice can be aided through collaborative research and through continuing attention to implementation issues. Involving experienced teachers as partners in collaborative research requires time and explicit efforts to link the work of schools with the work of universities. ETC established laboratory sites in several schools to learn what implementation of the Center's innovations entails. This research revealed that incorporating technology-enhanced guided inquiry approaches into regular classrooms requires changes not only in technology but also in curriculum and in teaching approaches. Implementation assistance must therefore include not only logistical help with issues such as schedules, equipment, and curriculum materials. It may also need to support a process of teacher education through which

teachers collaboratively rethink educational goals, strategies, and roles and invent ways to connect their own wisdom with the products of educational research.

- o Microcomputer-based conferencing has the potential to alleviate the isolation of secondary school teachers, both from one another and from new developments in their fields. However, observations of two networks and reports on others indicate different avenues to collegial exchange which require different network management strategies. Among unacquainted teachers who shared no common network tasks, specific information interests predominated, suggesting need for a large membership, guest experts, or access to supplementary information resources. Two other routes to collegial exchange are collaboration on structured tasks or interest in social contact among previously acquainted teachers.

Selected Accomplishments

- o The Center developed an approach to teaching for understanding in mathematics and science which: (1) focuses on key concepts in these subject areas; (2) builds on students' beginning ideas; (3) engaged students in a process of constructing knowledge that fosters understanding of key concepts, of models, and of the processes of mathematical and scientific reasoning; (4) takes advantage of new technologies to collect and sort data, represent and manipulate concepts, model and simulate phenomena.
- o The Center developed a research approach suited to its Center's mission of conducting research that will improve educational practice. This approach includes: (1) collaborative research and design teams involving teachers, researchers, subject matter experts, and curriculum and software developers in all phases of work; and (2) an integrated sequence of activities which combine research, software and curriculum development, and continual attention to issues of practical implementation in American schools. As part of this approach the Center established laboratory sites in the four school districts that are members of the ETC consortium to investigate the use of research-based innovations in real classrooms and schools.
- o The Center developed a multifaceted dissemination approach including the following list of products and strategies to make the Center's work useful to a broad range of audiences:

"Making Sense of the Future", a position paper on the role of technology in science and mathematics education, was distributed to more than 25,000 practitioners, researchers, and school administrators and policymakers at local, state, and federal levels.

More than 40 technical reports present the goals, data, and conclusion of ETC projects, of interest primarily to researchers and others concerned with research results.

Three conference reports summarize themes that emerge from conferences sponsored by ETC. Directed to a general audience, each report addresses a central issue in educational technology.

Three topical papers, written by ETC associates, explore topics that complement the technical reports.

Three Videotapes, and accompanying print materials, produced jointly by ETC and Education Development Center, highlight key relationships among teachers, technology, and subject matter. This material is designed for teachers, other school people, parents and policymakers.

Two pieces of published software have been developed in conjunction with research on computer-based conferencing and classroom use of software.

Prototype software and teaching materials, produced by several projects in the course of their research, are available as experimental units to teachers and other researchers.

"Targets", a national newsletter was published three times per year and circulated to over 15,000 individuals, organizations, and school districts across the country.

In addition to these products, the Center's dissemination efforts have included four conferences, most recently a national conference entitled "Making Sense of the Future." This event, sponsored in collaboration with several other institutions doing similar work, drew over 200 educators from across the country to a series of sessions synthesizing the first five years of ETC research.

Publications

Books and Articles

Chazan, Daniel, and Richard Houde, in press. How to Use Conjecturing and Microcomputers to Teach Geometry. Reston, VA: National Council of Teachers of Mathematics.

Chazan, Daniel, July 1988. "Proof and Measurement: An Unexpected Misconception." In Proceedings of the Twelfth International Conference of the Psychology of Mathematics Education. Budapest, Hungary.

Chazan, Daniel, 1987. "Similarity: Unraveling a Conceptual Knot with the Aid of Technology." Pp. 3-10 in Proceedings of the Eleventh International Conference: Psychology of Mathematics Education, vol. 2, edited by J. Bergeron, N. Herscovics, and C. Kieran. Montreal, Canada.

Goldenberg, E. Paul, 1988. Mathematics, Metaphors and Human Factors." Journal of Mathematical Behavior, vol. 7: 135-173.

Goldenberg, E. Paul, in press. "Exploring Decimals: A Conversation with Fourth Graders." Arithmetic Teacher.

Goldenberg, E. Paul and M. Kliman, in press. "Metaphors for Understanding Graphs: What You See is What You See." Journal of Mathematical Behavior.

Hancock, Christopher, December 1985. "Common Ground." Byte pp. 239-246.

Kaput, James J., Judah Schwartz and Joel Poholsky, 1985. "Extensive and Intensive Quantities in Multiplication and Division Word Problems: Preliminary report." Pp. 139-144 in Proceedings of the Seventh Annual Meeting of the PME-NA, edited by S.K. Damarin & M. Shelton. Columbus, Ohio.

Kaput, James J., 1986. "Information Technology and Mathematics: Opening New Representational Windows." The Journal of Mathematical Behavior 5: 187-207.

Kaput, James J., Clifton Luke, Joel Poholsky and Aline Sayer, August 1987. "Multiple Representations and Reasoning with Intensive Quantities." Pp. 289-295 in Proceedings of the Eleventh Annual Meeting of the PME-NA, vol. 2, edited by J. Bergeron, C. Kieran and N. Herscovics. University of Montreal.

Kaput, James J., in press. "Supporting Concrete Visual Thinking in Multiplicative Reasoning: Difficulties and Opportunities." In Focus on Learning Problems in Mathematics.

- Kaput, James J., in press. "Concrete Beginning for Multiplication, Division and Ratio." Journal of Mathematical Behavior, special issue on multiplication and division, edited by B. Greer.
- Kaput, James J., in press. "The Cognitive Foundations of Modeling with Intensive Quantities." In Proceedings of the Second Annual Conference on the Teaching of Mathematical Modeling, Kassel, FRG.
- Lampert, Magdalene, 1987. "Imagining an Ideal that is Also Possible" in the Teacher of Mathematics: Issues for Today and Tomorrow in Proceedings of meeting jointly sponsored by the Mathematical Sciences Education Board of the National Research Council and the Center for the Academic Inter-Institutional Programs of the University of California, Los Angeles.
- Mandinach, Ellen B., 1988. "Executive Summary of the STACI Project." Paper prepared for Apple Computer, Inc. Princeton, NJ: Educational Testing Service.
- Mandinach, Ellen B. and M. E. Thorpe, 1987. "The Systems Thinking and Curriculum Innovation Project." Technology and Learning 1: 10-11.
- Nickerson, Raymond and Philip Zohdites, eds., 1988. Technology and Education: Looking toward 2020. Hillsdale, NJ: Erlbaum.
- Perkins, David N. and Fay Martin, 1986. "Fragile Knowledge and Neglected Strategies in Novice Programmers." Pp. 213-229 in Empirical Studies of Programmers, edited by E. Soloway and S. Iyengar.
- Perkins, David N. et al., June 1986. "Conditions of Learning in Novice Programmers." Journal of Educational Computing Research 2:37-56.
- Perkins, David N., Steven Schwartz and Rebecca Simmons, 1988. "Instructional Strategies for the Problems of Novice Programmers." Pp. 153-178 in Teaching and Learning Computer Programming, edited by R. Mayer. Hillsdale, NJ: Erlbaum.
- Perkins, David N. and Rebecca Simmons, in press. "Patterns of Misunderstanding: An Integrated Model of Misconceptions in Science, Math and Programming." Review of Educational Research.
- Schwartz, Judah L., 1986. "The Power and the Peril of the Particular: Thoughts on a Role for Microcomputers in Science and Mathematics Education." Machine Mediated Learning 1:345-354.

Schwartz, Judah L. and Michal Yerushalmy, January 1987. "The Geometric Supposer: The Computer as Intellectual Prosthetic for the Making of Conjectures." College Mathematics Journal 18: 58-65.

Schwartz, Judah L., 1987. "The Geometric Supposer: Using Microcomputers to Restore Invention to the Learning of Mathematics." Pp. 525-536 in Thinking: Proceedings of the Second International Conference, edited by David N. Perkins, Jack Lochhead, and J. Bishop. Hillsdale, NJ: Erlbaum.

Schwartz, Judah L., July 1987. "The Representation of Function in the Algebraic Proposer." Pp. 235-240 in Proceedings of the Eleventh International Conference, Psychology of Mathematics Education, University of Montreal.

Schwartz, Steven, David Niguidula, and David N. Perkins, March 1988. "A Vitamin Shot for BASIC Classes." Computing Teacher 15: 62-64.

Wilson, Beth. December 1986. "When Technology Enhances Teaching." American Educator 10: 8-13, 46-47.

Wiser, Marianne, 1988. "The Differentiation of Heat and Temperature: History of Science and Novice-Expert Shift." Pp. 28-40 in Ontogeny, Phylogeny, and Historical Development, edited by S. Strauss. Norwood, NJ: Ablex.

Yerushalmy, Michael and Daniel Chazan, 1987. "Effective Problem Posing in an Inquiry Environment: A Case Study Using the Geometric Supposer." Pp. 53-60 in Proceedings of the Eleventh International Conference: Psychology of Mathematics Education, vol. 2, edited by J. Bergeron, N. Herscovics, and C. Kieran. University of Montreal.

Center Publications

Astrein, Bruce and Adria Steinberg, 1985. Computers, equity, and urban schools. (Conference Report CR85-28).

Carey, Susan et al., 1988. What junior high school students can do, and should know about the nature of scientific inquiry. (Technical Report TR88-2).

Chazan, Daniel. 1988. Similarity: Exploring the understanding of a geometric concept. (Technical Report TR88-15).

Cline, Hugh, 1989. What happens when a school starts using a microcomputer laboratory? The impact of a science and social

science microcomputer program on the structure and functioning of a high school. (Technical Report TR89-4).

Dede, Christopher, Philip P. Zoghiates and Charles L. Thompson, 1985. Intelligent computer-assisted instruction: A review and assessment of ICAI research and its potential for education. (Topical Paper TP85-25).

Education Development Center and Educational Technology Center, 1985. New tools for learning: Using computers in science education. (Videotape VT85-29).

Education Development Center and Educational Technology Center, 1986. Image, graph, symbol: Representation and invention in the learning of mathematics. (Videotape VT86-18).

Education Development Center and Educational Technology Center, 1988. A whole lot more: Teachers talk about computers in the classroom. (Videotape VT88-14).

Educational Technology Center, 1984. The use of information technologies for education in science, mathematics, and computers: An agenda for research. (Technical Report TR84-1).

Educational Technology Center, 1988. Making sense of the future: A position paper on the role of technology in science, mathematics, and computing education. (Position Paper PP88-0).

Frenette, Micheline. Promoting changes in children's predictive rules about natural phenomena: The role of computer-based modelling strategies. (Technical Report TR89-2).

Goldenberg, E. Paul et al., 1988. Mathematical, technical, and pedagogical challenges in the graphical representation of functions. (Technical Report TR88-4).

Goldenberg, E. Paul, and M. Kliman, 1988. Metaphors for understanding graphs: What you see is what you see. (Technical Report TR88-22).

Hancock, Christopher, 1986. Common Ground. (Software SW86-16).

Janszen, Karen, A. Favaloro, and C. Mellin, 1988. Educational design of videodiscs: The influence of design approaches and school factors on early classroom uses. (Technical Report TR88-17).

Julyan, Candace and Kim Storey, 1985. The integrated design and use of computers and television in education. (Technical Report TR85-20).

- Kaput, James J., 1985. Multiplicative word problems and intensive quantities: An integrated software response. (Technical Report TR85-19).
- Kaput, James J., 1986. Information technology and mathematics: Opening new representational windows. (Topical Paper TR86-3).
- Kaput, James J. and Laurie Pattison-Gordon, 1987. A concrete-to-abstract software ramp: Environments for learning multiplication, division, and intensive quantity. (Technical Report TR87-8).
- Kaput, James J., 1988. Supporting concrete visual thinking in multiplicative reasoning: Difficulties and opportunities. (Technical Report TR88-16).
- Katz, (West) M. Maxwell, Eileen McSwiney, and Kathryn Stroud, 1987. Facilitating collegial exchange among science teachers: An experiment in computer-based conferencing. (Technical Report TR86-14).
- Katz, (West) M. Maxwell, et al., 1987. Talking about teaching, by writing: The use of computer-based conferencing for collegial exchange among teachers. (Technical Report TR87-12).
- Kipman, Daphna, 1988. Prototype heat/temperature software. (Software SW88-TK).
- Lampert, Magdalene, 1988. Teachers' thinking about students' thinking about geometry: The effects of new teaching tools. (Technical Report TR88-1).
- Lampert, Magdalene, 1988. Teaching that connects students' inquiry with curricular agendas in schools. (Technical Report TR88-27).
- McDonald, Joseph P., 1985. The computer as teaching tool: Promising practices. (Conference Report CR85-10).
- McDonald, Joseph P. and P. Naso, 1986. Teacher as learner: The impact of technology. (Conference Report CR86-4).
- McDowell, Ceasar, Martha Stone Wiske, Rosalyn Browne, Albert Holland, and U. T. Saunders, 1987. A model program in science, mathematics, and technology. (Topical Paper TP87-9).
- Mandinach, Ellen B., Margaret Thorpe and Colleen M. Lahart, 1988. The impact of the systems thinking approach on teaching and learning activities. (Technical Report TR88-31).

- Mandinach, Ellen B., 1988. Self-regulated learning substudy: Systems Thinking and Curriculum Innovation (STACI) Project. (Technical Report TR88-25).
- Mandinach, Ellen B. and M. E. Thorpe, 1987. The systems thinking and curriculum innovation project: Part I. (Technical Report TR87-6).
- Mandinach, Ellen B. and M. E. Thorpe, 1988. Systems Thinking and Curriculum Innovation Project: Part II. (Technical Report TR88-12).
- Morrison, Donald, 1986. Immigrant. (Software SW86-17).
- Pattison-Gordon, Laurie, 1987. Prototype word problems software. (Software SW 88-10).
- Perkins, David N. and Fay Martin, 1985. Fragile knowledge and neglected strategies in novice programmers. (Technical Report TR85-22).
- Perkins, David N., Fay Martin, and Michael Farady, 1986. Loci of difficulty in learning to program. (Technical Report TR86-6).
- Perkins, David N. et al., 1986. Nontrivial pursuit: The hidden complexity of elementary Logo programming. (Technical Report TR86-7).
- Prototype programming metacourse, 1987. (Teaching Materials TM88-9A).
- Prototype weight/density teaching materials., 1988. (Teaching Materials TM88-24).
- Schwartz, Steven, David N. Perkins, Greg Estey, John Kruidenier, and Rebecca Simmons, 1987. An empirical study of a "Metacourse" to enhance the learning of BASIC. (Technical Report TR87-7).
- Schwartz, Steven, et al., 1988. Empirical studies of a "Metacourse" to enhance the learning of BASIC. Prototype Programming Metacourse. (Teaching Materials TM88-9A).
- Schwartz, Steven, et al., 1988. (Empirical studies of a "Metacourse" to enhance the learning of BASIC. (Technical Report TR88-13).
- Shepard, Joyce W. and Martha Stone Wiske, 1988. Extending technological innovations in schools: Three case studies and analysis. (Technical Report TR88-29).

- Smith, Carol, 1985. Weight, density and matter: A study of elementary children's reasoning about density with concrete materials and computer analogs. (Technical Report TR85-15).
- Smith, Carol, Joseph Snir, Lorraine Grosslight, and Micheline Frenette, 1986. Promoting 6th graders' understanding of density: A computer modeling approach. (Technical Report TR86-5)
- Smith, Carol, 1987. Teaching for conceptual change using a computer-based modeling approach: The case of weight/density differentiation. (Technical Report TR87-11).
- Snir, Joseph, 1988. Prototype Weight/Density Software. (Software SW88-11).
- Snir, Joseph, Carol Smith, and Lorraine Grosslight, 1988. The truth but not the whole truth: An essay on building a conceptually enhanced computer simulation for science teaching. (Technical Report TR88-18).
- Storey, Kim, Harry Lasker, and Karen Janszen, 1985. The ETC science videodisc project: A report of research in progress. (Technical Report TR85-18).
- Storey, Kim and Carolyn Mellin, 1987. A prototype science interactive videodisc: Research on in-school use. (Technical Report TR87-4).
- Supplemental materials for the Metacourse, 1988. (Teaching Materials TM88-9B, 9C, and 9D).
- Thompson, Charles L., Beth Wilson, Philip P. Zoghiates, and Irene Kantrov, 1985. Speech Recognition Technology: An application to beginning reading instruction. (Technical Report TR85-24).
- West (Katz), Mary Maxwell and Eileen McSwiney, 1989. Computer networking for collegial exchange among teachers: A summary of findings and recommendations. (Technical Report TR89-1).
- Wiser, Marianne, 1988. Can models foster conceptual change? The case of heat and temperature. (Technical Report TR88-7).
- Wiser, Marianne and Daphna Kipman, 1988. The differentiation of heat and temperature: An evaluation of the effect of microcomputer models on students' misconceptions. (Technical Report TR88-20).

- Wiser, Marianne, 1986. The differentiation of heat and temperature: An evaluation of the effect of microcomputer teaching on students' misconceptions. (Technical Report TR87-5).
- Wiske, Martha Stone, David Niguidula, and Joyce W. Shephard, 1988. Collaborative research goes to school: Guided inquiry with computers in classrooms. (Technical Report TR88-3).
- Wiske, Martha Stone. A cultural perspective on school-university collaborative research, 1989. (Technical Report TR89-3).
- Wiske, Martha Stone and Richard Houde, 1988. From recitation to reconstruction: Teachers change with new technologies. (Technical Report TR88-28).
- Wiske, Martha Stone et al., 1987. How technology affects teaching. (Technical Report TR87-10).
- Yerushalmy, Michael, Daniel Chazan, and Myles Gordon, 1988. Guided inquiry and technology: A year-long study of children and teachers using the Geometric Supposer. (Technical Report TR88-6).
- Yerushalmy, Michael, Daniel Chazan, and Myles Gordon, 1988. Posing problems: One aspect of bringing inquiry into classrooms. (Technical Report TR88-21).

Publications can be obtained by writing to the following address:

Publications
Educational Technology Center
337 Gutman Library
Appian Way
Cambridge, MA 02138

Purchase orders accepted only for orders over \$50.00.
For orders outside the United States, please add \$10.00 to cover shipping costs. Otherwise prices include postage and handling.

CENTER FOR LANGUAGE EDUCATION AND RESEARCH

University of California
1100 Glendon Avenue, Suite 1740
Los Angeles, California 90024
(213) 206-1486

Director: Russell N. Campbell

Steering Committee: Russell N. Campbell, UCLA
Concepción Valadez, UCLA
G. Richard Tucker, CAL

Affiliated Institution: Center for Applied Linguistics

Mission

The mission of this center is to assist in developing a language-competent American society. Its primary goals are to develop the English language competence and academic skills of language minority students, and to develop the second/foreign language experience and competence of English-speaking, monolingual students. In pursuit of these goals, CLEAR's staff of social science and educational researchers are involved in research, development, and dissemination activities which will improve knowledge, instruction, curriculum and materials in bilingual and foreign language education.

Programs of Research

Academic Knowledge Base

Professional Development
of the Language Educator

Improvement of Content of
Curricula, and Programs

Linguistic and Metalin-
guistic Underpinnings of
Academic Learning

Principal Investigators

Concepción Valadez, UCLA
Richard Durán, UC-Santa
Barbara
Joy Kreeft Peyton, CAL
George Spanos, CAL
JoAnn Crandall, CAL
Evelyn Jacob, CAL
Marguerite Ann Snow, UCLA

JoAnn Crandall, CAL
Concepción Valadez, UCLA
Donna Christian, CAL

Donna Christian, CAL
Concepción Valadez, UCLA

Kenji Hakuta, UC-Santa Cruz
Catherine Snow, Harvard
Kathryn Lindholm, UCLA
Eduardo Cascallar, UCLA

Second Language Instructional Programs

Nancy Rhodes, CAL
Rebecca Oxford, CAL
Marguerite Ann Snow, UCLA
Russell Campbell, UCLA
José Galván, UCLA
Charles Stansfield, CAL

Language Attrition

Marguerite Ann Snow, UCLA
José Galván, UCLA
Charles Stansfield, CAL

Relations Across Linguistic Minority Programs and Second Language Programs

Kathryn Lindholm, UCLA
Mary McGroarty, UCLA
Eduardo Cascallar, UCLA
José Galván, UCLA

OERI Center Liaison: John Taylor
Office of Research
Learning and Instruction Division
(202) 357-6021

Major Research Findings

Language Education Strategies

- o A national survey of American pre-college educational institutions revealed that slightly more public than private secondary schools currently teach foreign languages (93% compared to 86%) but that they are taught at twice the rate in private as opposed to public elementary schools (34% compared to 17%). It was concluded that American educators must focus on developing a more rigorous national foreign language program, with instruction beginning in the early grades and continuing through high school, and with fluency in the foreign language, rather than mere exposure to it, as the fundamental goal.
- o A study of communicative interactions in a classroom containing both language minority and majority children found that students acquired language and eventually became literate as the result of a myriad of interrelated learning steps. These learning steps were managed by a teacher who carefully erected "scaffolds" for each individual student, always adding the new language structures onto the supporting scaffold.
- o A series of studies assessed the nature of translation skills in bilingual children in 4th and 5th grades. Children translated from Spanish to English and from

English to Spanish on a variety of tasks. It was found that the children made very few errors that involved intrusion across languages, which suggested that they kept the two languages well separated cognitively; their translation efficiency was best predicted by their proficiency in the language into which the translation was made; and translation ability was not related to their academic talent, but was well distributed among all the children.

- o Translation activities were incorporated into a pilot curriculum for teaching Spanish to English-dominant language minority students in a Spanish-for-Spanish-speakers program in the 8th grade. It was found that translation served to motivate the students to develop their native language skills. An ethnography revealed the role that translation played in the classroom interaction.
- o Two studies of adults (of mixed first language backgrounds), studying English as a second language provided information on the strategies and attitudes of successful learners. Successful learners were most likely to use specific study strategies in class, less likely during individual study, and least of all during interaction in English outside of class. Behaviors showing active use of the language, such as asking the teacher about exceptions or examples, using English at a job, or reading English to practice, were linked with higher achievement, but simply starting conversations in English was not.
- o An intensive case study of a teacher's strategies in teaching language skills through a process of "interactive writing" revealed that the teacher's encouragement of the students to select their own topics resulted in more elaborate and complex writing samples.
- o In a study of question/answer exchanges during math and science lessons in multicultural elementary classrooms, the features of a "good response" were identified in the verbal academic language of students described as "effective communicators" by their teachers. In general, students who were considered "effective" were adept at working with the teacher to construct this type of academic discourse.
- o Studies of students enrolled in introductory college Spanish and Japanese classes provided insights into the learning strategies used by the "good language learner." Good learners, for example, employed active questioning strategies, risked making guesses about the

language, monitored their own speech and writing by correcting themselves, and used the broadcast media to expand their exposure to authentic language input. On the other hand, good learners did not memorize language chunks without analyzing them, correct themselves during natural interactions, or analyze contrasts between the native and foreign languages. These findings provided teachers with information that is readily applicable to the language classroom.

- o Good versus poor 3rd and 5th grade Spanish readers were tested for their reading comprehension and oral language proficiency in English. Results indicated that the good Spanish readers performed much better than the poor readers on tasks of oral decontextualized language in both English and Spanish, especially in the 3rd grade, and were also better readers in English. For 5th graders, the differentiation between good and poor readers was less clear.
- o An adjunct model of language instruction at UCLA which integrated language instruction with content instruction received very positive evaluations by the students and resulted in significant increases in students' self-confidence. Despite lower English proficiency scores, ESL students were comparable to regularly enrolled students in a simulated written examination.

Bilingual Education

- o In a study of 105 elementary foreign language learners, those rated as showing the highest proficiency in a second language conversational task did not differ from those rated lower on measures of fluency, language-mixing, or self-correction, but they did differ on their ability to produce conversational turns that responded on-topic to the interlocutor while also furthering the conversation with new topic-starters. The students' performance on the conversation task showed no direct relation to their performance on a writing task, indicating that a componential model of second language proficiency is preferable to a single-proficiency model.
- o In a study of elementary students in a Spanish-English bilingual program, it was found that teacher ratings of the students' native language skills predicted their writing performance in English better than ratings of their English skills. It was also found that a

multi-faceted assessment of English skills aided in the correct placement of children in either bilingual or mainstream classrooms.

- o A study of school districts with exemplary educational programs for linguistic minority students found several patterns: (1) School officials sought ways to address the educational needs of these students before being required to do so; (2) They actively collaborated with researchers; (3) They fostered two-directional leadership--from the district level to the classroom and vice versa; (4) They engaged in constant evaluation and adjustment, with teachers and the community playing key roles in program changes; and (5) Teachers in successful schools tended to be demanding of themselves and of the programs.

Immersion Education

- o A national survey of teachers in language immersion classrooms identified a series of instructional strategies/techniques that help students learn subject-matter content via a second language. These included the teachers' extensive use of body language, allowing for predictability in routine instructional tasks (assignments, homework directions, etc.), drawing on the students' existing background knowledge to aid their comprehension of new material, extensive use of visuals and/or manipulatives, and structured reviews of previously covered material.
- o A study of over 600 secondary students in a bilingual partial immersion program in the San Diego area compared three instructional tracks intensive Spanish as a second language, Spanish for native speakers, and regular Spanish as a foreign language. Results supported the intensive second language model as promoting higher levels of Spanish proficiency in non-native speakers, including listening comprehension, reading comprehension, writing and speaking. This study demonstrated that foreign language courses can be tailored to the needs of students in ways that promote greater language proficiency.
- o A study after the first year of implementation of an elementary school Spanish/English bilingual immersion program in the Los Angeles area demonstrated strong language development, in both languages, of native Spanish-speaking and native English-speaking students. In addition, the gains in language skills were matched with average to above average achievement test performance, whether the achievement tests were in Spanish or English. The study concluded that the bilingual immersion model was effective for both language minority and language majority students.

- o The longitudinal evaluation of an "exemplary" bilingual immersion program in San Diego, which integrated Spanish and English language instruction with instruction in the core academic content areas, demonstrated strong achievement gains in reading and math in both English and Spanish language tests. The students involved in this program performed above national norms in all subject areas by the end of elementary school.

Language and Cognition

- o An experimental study was conducted with first grade children in a bilingual education program to examine the nature of the transfer from Spanish to English of time and space concepts first taught in Spanish. Results confirmed that specific concepts transferred easily and suggested that transfer is a global process that involves holistic skills in the native language which serve as a foundation for the learning of specific concepts in the second language.
- o In a study of formal definitions in 137 second- to fifth-grade children, half of whom were language minority, findings revealed that the sophistication of formal definitions produced by these students was related to their school achievement. The study suggested that the ability to provide sophisticated formal definitions required skill in the use of decontextualized language, and that this skill may be crucial to general success in school.
- o An investigation of language and problem-solving performance of secondary school science students demonstrated that language minority students often lacked the language skills needed for the study of content areas like science. The study of seven physical science classes, which involved more than 150 language minority and majority students, revealed a relationship between language and problem-solving skills, as in the example of verbalizing the steps in solving a problem. A set of materials was developed to assist these students to acquire the needed language skills and to participate more effectively in sheltered or mainstream science classes.
- o A series of psycholinguistic studies regarding syntactic and semantic language processing in bilingual and monolingual subjects found a functional difference between syntactic and semantic memory, and suggested different processing and acquisition patterns.
- o In a study of 150 2nd through 5th graders, children were tested in English on a picture description task under two conditions, with or without help from the examiner. Groups of native monolingual English speakers and native English-

dominant bilinguals performed better than non-native children without the examiner's help, but not differently on the assisted task. The non-native children, all former ESL students, functioned well in challenging classroom environments, but still showed subtle deficits in English on the unassisted task. These results indicated that full acquisition of a second language for use in decontextualized and academic tasks can take several years.

- o The factors most strongly affecting the English verbal reasoning skills of elementary children in a Spanish-English bilingual program were found to be: (1) Spanish verbal reasoning, (2) oral proficiency in Spanish decontextualized language, and (3) ability to take the listener's point of view in English. For the 97 bilingual program students who participated in the study (most in their 3rd or 4th year of bilingual education), verbal reasoning in Spanish was still better than in English, indicating that rapid exit from bilingual programs may artificially lower assessments of their competence.
- o A study of the onset of reading among kindergarten and first grade students identified patterns of language dominance in the bilinguals and defined different aspects of language proficiency (i.e., semantic functioning and communicative competence). When tested in their weaker language, bilingual kindergarten children fell behind in basic reading ability. In the case of early reading in English, group differences were more related to differences in language proficiency and lack of formal English instruction than to differences in cognitive ability and home background.
- o A study of reading strategies used by 7th grade language minority students identified a number of high-level reading comprehension strategies that were not adequately assessed by existing reading comprehension tests.
- o A study of logical reasoning skills of language minority college-aged students developed a computerized technique for assessing and training students to recognize fallacious and valid logical arguments. Findings indicate that language minority students were prone to make many of the same kinds of reasoning errors as non-language minority students, and that they could benefit from the development of diagnostic profiles of their error patterns.

Selected Accomplishments

- o More than 20 teachers who used interactive writing with language minority students at all grade levels were asked to evaluate their experiences. CLEAR researchers

collected and synthesized these data and prepared a handbook describing effective approaches for integrating writing into a language arts/ESL program.

- o Information from interviews with teachers and students provided guidelines for helping the classroom teacher to be more effective in developing the oral language skills of limited English proficient (LEP) students. The findings from this study were: (1) classroom interactions (teacher questions and student responses) were most effective when they were structured to build a collaborative response; (2) the language skills of the LEP child was enhanced by using techniques which make the social and instructional features of classroom discourse more explicit; and (3) the classroom interactive practices which were helpful to LEP students were helpful to all students.
- o An innovative reading assessment procedure, which draws on recent cognitive science research, was developed for use with Hispanic youths. It involved the use of information about the student's skill in deriving meaning from the text at various levels of understanding. The analysis also provided diagnostic information about the student's comprehension skills.
- o More than twelve schools in California, Connecticut, Maryland, Texas, and Virginia were involved in CLEAR's program of research and professional development. A large number of schools also received technical assistance.
- o Numerous presentations have been made by CLEAR staff at school board meetings, educational practitioner meetings and workshops, parent group meetings and workshops, and conferences.
- o More than 400 individuals and institutions participated in a network of practitioners and researchers interested in the use of interactive writing. A quarterly newsletter, Dialogue, was produced and distributed, and other information dissemination and networking functions were performed by CLEAR staff.
- o In response to the need for information about "hard to find" language education materials, CLEAR established a database for listing existing materials, curricula, and programs in such areas as intensive foreign language instruction, the teaching of "less commonly taught" languages such as Chinese or Arabic, and the integration of language and content instruction.
- o CLEAR has assisted national efforts to improve second language education by actively collaborating with groups

such as the Advocates for Language Learning, a parent organization, and the National Network for Early Language Learning, a group of elementary educators.

- o Two test instruments were developed to fill significant gaps in language assessment. The CLEAR Oral Proficiency Exam (COPE) was developed for use with elementary school students to provide a measure of a language learner's ability to understand, speak, and be understood by others, with particular focus on the school context. The test, with versions in both English (for ESL students) and Spanish (for students in intensive foreign language programs), uses a role-play situation between two students to assess cognitive/academic language skills as well as social language skills. The second instrument, the Spanish FLES test, was developed for fifth and sixth graders who have been studying Spanish less intensively. It assesses listening and reading skills, and tests concepts which are most commonly included in a FLES program.
- o CLEAR published an Immersion Teacher Handbook that has served as a useful resource for immersion teachers, for teachers in training, for program administrators, and for parents. The Immersion Teacher Handbook provided a detailed overview of the immersion model, including instructional methodologies, implementation strategies, assessment, and suggested readings.
- o The CLEAR Instructional Materials Inventory was developed as a tool for evaluating commercially produced textbooks and other instructional materials in terms of their appropriateness for the instructional needs of linguistic minority students.
- o From a nationwide search, CLEAR identified all of the programs that fit the definition of bilingual immersion education (programs that provide academic and language arts instruction in two languages). A directory of these programs was published and disseminated.
- o A series of seminars on the integration of language and content learning, which were sponsored by CLEAR and the Center for Applied Linguistics, resulted in a handbook for practitioners who are interested in implementing this innovative approach for the education of limited-English speaking and foreign language students. It includes guidelines for combining language and content instruction, and descriptions of the kinds of programs and materials that either exist or need to be developed.

- o Based on a comprehensive review of research, a taxonomy of second language learning strategies was published, serving as the most complete system available for classifying second language learning strategies.
- o A comprehensive review of the certification requirements for teachers of ESL, bilingual education, and foreign languages--in each of the 50 states and the District of Columbia--was published and disseminated. In addition to detailed descriptions of these requirements, the many terms used by the various states to describe their certification procedures were examined, and general trends in the certification of language program teachers were highlighted.
- o CLEAR conducted a series of seminars on exemplary teaching practices for language minority students. Prominent scholars and teachers from across the U.S. attended these meetings.
- o CLEAR conducted a three-day Seminar on American Indian Bilingual Education. Policy, curriculum, teacher training and assessment issues were discussed by representatives of the following American Indian nations: Navajo, Pueblo, Yaqui, Cree, Choctaw, Chippewa, Lumbee.
- o CLEAR has disseminated several thousand copies of their Educational and Technical reports, at no cost, to interested individuals.

Publications

Books and Articles

Brinton, Donna, Marguerite A. Snow, and Marjorie Wesche. In Press. Content-Based Second Language Instruction. Cambridge, MA: Newbury House.

Brinton, Donna, Linda Sasser, and Beth Wunningham. 1988. "Helping Language-Minority Students Prepare for University Reading and Writing." In Teaching Analytical Writing, edited by George Gadda, Faye Peitzman and William Walsh. CAPP Dissemination Project.

Campbell, Russell N., and Kathryn J. Lindholm. In Press. "Conservation of Language Resources." In SLA-FLL: On the Relationship Between Second Language Acquisition and Foreign Language Learning, edited by B. VanPatten and J. F. Lee. New York: Newbury House Publishers.

Crandall, JoAnn, (Ed.) 1987. ESL Through Content-Area Instruction: Mathematics, Science, Social Studies. Englewood

Cliffs, NJ: Prentice Hall Regents/Center for Applied Linguistics.

Crandall, JoAnn, George Spanos, Donna Christian, Carmen Simich-Dudgeon, and Karen Willetts. 1988. Integrating Language and Content Instruction for Language Minority Students. NCBE Teacher Resource Guide No. 5. Wheaton, MD: National Clearinghouse of Bilingual Education.

Crandall, JoAnn and Karen Willetts. 1986. "Content-Based Language Instruction." ERIC/CLL News Bulletin 9(2):1,7-8.

Curtain, Helena A. 1986. "Integrating Language and Content Instruction." ERIC/CLL News Bulletin 9(2):1,10-11.

Davidson, R., S. Kline, and C. Snow. 1986. "Definitions and Definite Noun Phrases: Indicators of Children's Decontextualized Language Skills." Journal of Research in Childhood Education 1:37-48.

Durán, Richard P. In press. "Testing of Linguistic Minorities." In Educational Measurement (Third Edition), edited by R. Linn. New York: Macmillan.

Duran, Richard P. 1988. "Validity and Language Skills Assessment." In Test Validity, edited by H. Wain and H. Braun. Hillsdale, NJ: Lawrence Erlbaum Associates.

Duran, Richard P. 1987. "Metacognition in Second Language Behavior." In Language, Literacy, and Culture: Issues of Society and Schooling, edited by J. Langer. Norwood, NJ: Ablex.

Duran, Richard P. 1987. "Factors Affecting Development of Second Language Literacy." In Becoming Literate in English as a Second Language, edited by S. Goldman and H. Trueba. Norwood, NJ: Ablex.

Duran, Richard P. 1985. "Influences of Language Skills on Bilinguals' Problem Solving." In Thinking and Learning Skills: Research and Open Questions, Vol 2, edited by J. W. Segal, S. F. Chipman, & R. Glaser. Hillsdale, NJ: Lawrence Erlbaum Associates.

Galambos, S. and Kenji Hakuta. 1988. "Subject-Specific and Task-Specific Characteristics of Metalinguistic Awareness in Bilingual Children." Applied Psycholinguistics, 9:141-162.

Hakuta, Kenji. In press. "Bilingualism." Oxford International Encyclopedia of Linguistics. Oxford University Press.

- Hakuta, Kenji. 1987. "Degree of Bilingualism and Cognitive Ability in Mainland Puerto Rican Children." Child Development 58:1372-1388.
- Hakuta, Kenji. 1987. "Societal and Policy Contexts of Research with Language Minority Students." Pp. 7-20 in Proceedings of the University of California Linguistic Minority Project Conference, edited by C. Underwood. Berkeley, CA: University of California, Berkeley.
- Hakuta, Kenji & Eugene E. Garcia. In press. "Bilingualism and Education." American Psychologist.
- Hakuta, Kenji and L. Gould. 1987. "Synthesis of Research on Bilingual Education." Educational Leadership 44:39-45.
- Hakuta, Kenji, B. M. Ferdman, and R. M. Diaz. 1987. "Bilingualism and Cognitive Development: Three Perspectives." Pp. 284-319 in Advances in Applied Psycholinguistics Volume II: Reading, Writing and Language Learning, edited by S. Rosenberg. Cambridge: Cambridge University Press.
- Hakuta, Kenji and M. Rodriguez-Lansberg. In press. "El Papel del Primer Idioma en la Adquisición de un Segundo Idioma." Proceedings of the Ateneo Puertorriqueño International Symposium on Bilingualism.
- Jacob, Evelyn. 1987. "Cooperative Learning with Limited English Proficient Students." Q & A, ERIC Clearinghouse on Language and Linguistics. Washington, DC: Center for Applied Linguistics.
- Lindholm, Kathryn J. In press. "English Question Development in Second Language Learners: Relationship Between Semantic Context and Linguistic Complexity." Interface: Journal of Applied Linguistics, 2.
- Lindholm, Kathryn J. 1987. "English Question Use in Spanish-Speaking ESL Children: Changes with English Language Proficiency." Research in the Teaching of English, 21:64-91.
- Mohan, Bernard A. 1986. "Language and Content Learning: Finding Common Ground." ERIC/CLL News Bulletin 9(2):1,8-9.
- Oxford, Rebecca L. and Nancy C. Rhodes. 1988. "U.S. Foreign Language Instruction: Assessing Needs and Creating an Action Plan." ERIC/CLL News Bulletin 11(2):1,6-7.
- Padilla, Amado M. 1986. "Educating Educators About Hispanics: Review of H. Grossman, Educating Hispanic Students." Contemporary Psychology, 31:452-453.

- Peyton, Joy Kreeft. 1987. Dialogue Writing With Limited English Proficient Students. Q & A, ERIC Clearinghouse on Language and Linguistics. Washington, DC: Center for Applied Linguistics.
- Peyton, Joy Kreeft. 1986. "Making Writing Meaningful for Language Minority Students. NABE News 10(1):19-21.
- Peyton, Joy Kreeft. 1986. "Literacy Through Written Interaction." Passage: A Journal of Refugee Education 2(1):24-29.
- Peyton, Joy Kreeft, Mulugetta Seyoum, and Walt Wolfram. In press. "The Effect of Teacher Strategies and Students' Interactive Writing: The Case of Dialogue Journals." Research in the Teaching of English.
- Prince, C. D. and Kenji Hakuta. 1987. "Bilingualism in a Community Perspective: The Case of New Haven." Pp. 17-38 in Schooling Language Minority Youth, Vol. III: Proceedings of the University of California Linguistic Minority Research Project Conference. Los Angeles: UCLA.
- Rhodes, Nancy C. and Rebecca L. Oxford. 1988. "Foreign Languages in Elementary and Secondary Schools: Results of a National Survey." Foreign Language Annals 21:51-69.
- Rhodes, Nancy C. and Rebecca L. Oxford. 1987. "National Survey Profiles FLES." FLES News 1(1):3,7.
- Simich-Dudgeon, Carmen, Lynn McCreedy, and Mary Schleppegrell. In press. Helping Limited English Proficient Children Communicate in the Classroom: A Handbook for Teachers. NCBE Program Guide No. 6. Wheaton, MD: National Clearinghouse for Bilingual Education.
- Snow, Catherine E. 1987. "The Problem with Bilingual Education Research Critiques: A Reply to Rossell." Equity and Excellence 23: 30-31.
- Snow, Catherine E. 1988. "Relevance of the Notion of a Critical Period to Language Acquisition." In Sensitive Periods in Development: Interdisciplinary Perspectives, edited by M. Bornstein. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Snow, Catherine E. 1987. "Beyond Conversation: Second Language Learners' Acquisition of Description and Explanation." In Research in Second Language Learning: Focus on the Classroom, edited by J. Lantolf & A. Labarca. Norwood, NJ: Ablex.
- Snow, Catherine E. and Herlinda Cancino. In press. "Giving Definitions: A Linguistic or Metalinguistic Skill?" In

Language Processing and Language Awareness by Bilingual Children, edited by E. Bialystock. New York: Cambridge University Press.

Snow, Catherine E., H. Cancino, P. Gonzalez and E. Shriberg. In press. "Giving Formal Definitions: An Oral Language Correlate of School Literacy." In Literacy in Classrooms, edited by D. Bloome. Norwood, NJ: Ablex.

Snow, Marguerite A. 1987. Immersion Methodology: How Do Immersion Teachers Make Instruction in a Foreign Language Comprehensible? FLES NEWS. Vol. 1, No. 1.

Snow, Marguerite A. and Donna M. Brinton. In press. "Content-Based Second Language Instruction: Investigating the Effectiveness of the Adjunct Model." TESOL Quarterly.

Snow, Marguerite A. and Donna M. Brinton. In press. "The Adjunct Model of Language Instruction: An Ideal EAP Framework." In Beyond Remediation, edited by Sarah Benesch. Washington, DC: TESOL Publications.

Snow, Marguerite A. and Donna M. Brinton. 1986. "The Adjunct Language Instruction: An EAP Framework." CATESOL News, 18, 4:16-17.

Snow, Marguerite A., Amado M. Padilla, and Russell N. Campbell. 1988. "Patterns of Second Language Retention of Graduates of a Spanish Immersion Program." Applied Linguistics, 9:182-197

Spanos, George and JoAnn Crandall. 1988. "Integrating Language and Content: Improving Academic Achievement for LEP Children." Pp. 23-40 in Proceedings of the Delaware ESL-Bilingual Symposium, edited by Rebecca Scarborough. Dover, DE: Department of Public Instruction.

Sue, Stanley, and Amado M. Padilla. 1986. "Ethnic Minority Issues in the United States: Challenges for the Educational System." Pp. 35-72 in Beyond Language: Social and Cultural Factors in Schooling Language Minority Students, edited by California State Department of Education. Los Angeles: Evaluation, Dissemination and Assessment Center, California State University, Los Angeles.

Valadez, Concepcion M. 1987. "Modelos para la capacitacion del maestro en servicio" (Models for In-service Teacher Professional Development), Memoria del 2 Seminario Sobre Investigacion Educativa. (Proceedings of Second Seminar on Educational Research). Morelia, Michoacan, Mexico: Instituto Michoacano de Ciencias de la Educacion (IMCED).

Valadez, Concepcion M. 1986. "Effective Teachers for Language Minority Students: National Needs." In Committee on Education and Labor, House of Representatives, 99th Congress, 2d Session, Compendium of Papers on the Topic of Bilingual Education (Serial No. 99-R) Washington, D.C.: U.S. Government Printing Office.

Valadez, Concepcion M. "Language Minority Students and Educational Reform, An Incomplete Agenda." In Sol Cohen and Lewis Solmon (ed) From the Campuses: Perspectives on the School Reform Movement. Praeger Publishers (in press).

Center Publications

Campbell, Cherry. 1987. Writing with Others' Words: Native and Non-native University Students' Use of Information from a Background Reading Text in Academic Compositions (Technical Report No. 4). Los Angeles, CA: Center for Language Education and Research.

Campbell, Russell N., and Kathryn J. Lindholm. 1987. Conservation of Language Resources (Educational Report No. 6). Los Angeles, CA: Center for Language Education and Research.

Durán, Richard P. 1987. Reasoning Skills of Language Minority Students (Educational Report No. 9). Los Angeles, CA: Center for Language Education and Research.

Hakuta, Kenji. 1987. Cognitive Development of Bilingual Children. (Educational Report No. 3). Los Angeles, CA: Center for Language Education and Research.

Hakuta, Kenji, Bernardo M. Ferdman, and Rafael M. Diaz. 1986. Bilingualism and Cognitive Development: Three Perspectives and Methodological Implications (Technical Report No. 2). Los Angeles, CA: Center for Language Education and Research.

Lindholm, Kathryn J. 1986. English Question Use in Spanish-Speaking ESL Children: Changes with English Language Proficiency (Technical Report No. 1). Los Angeles, CA: Center for Language Education and Research.

Lindholm, Kathryn J. 1987. Directory of Bilingual Immersion Programs: Two-way Bilingual Education for Language Minority and Majority Students (Educational Report No. 8). Los Angeles, CA: Center for Language Education and Research.

Lindholm, Kathryn J. 1988. The Edison Elementary School Bilingual Immersion Program: Student Progress after One Year

- of Implementation (Technical Report No. 9). Los Angeles, CA: Center for Language Education and Research.
- Lindholm, Kathryn J. 1989. Evaluation of an "Exemplary" Bilingual Immersion Program. (Educational Report No. 13). Los Angeles, CA: Center for Language Education and Research.
- McFerren, Margaret, Concepción M. Valadez, JoAnn Crandall, Rosa S. Palomo and Clementina P. Gregoire. 1988. Certification of Language Educators in the United States (Educational Report No. 11). Los Angeles, CA: Center for Language Education and Research.
- McFerren, Margaret, and Barbara Robson. 1987. Criteria for the Evaluation of Secondary and Post-secondary Foreign Language Teaching Materials (Educational Report No. 4). Los Angeles, CA: Center for Language Education and Research.
- McGroarty, Mary. 1988. The "Good Learner" of English in Two Settings. (Technical Report 12). Los Angeles, CA: Center for Language Education and Research.
- McGroarty, Mary. 1988. University Foreign Language Learning: Spanish and Japanese. (Technical Report 10). Los Angeles, CA: Center for Language Education and Research.
- McGroarty, Mary. 1988. University Foreign Language Learning: What Predicts Success? (Educational Report 13). Los Angeles, CA: Center for Language Education and Research.
- Padilla, Amado M., Concepción Valadez and Mario D. Chang. 1988. Young Childrens' Oral Language Proficiency and Reading Ability in Spanish and English. (Technical Report No. 11). Los Angeles, CA: Center for Language Education and Research.
- Oxford, Rebecca L. 1986. Second Language Learning Strategies: Current Research and Implications for Practice (Technical Report No. 3). Los Angeles, CA: Center for Language Education and Research.
- Oxford, Rebecca L., and Nancy C. Rhodes. 1987. U.S. Foreign Language Instruction at the Elementary and Secondary School Levels: A Nationwide Profile (Educational Report No. 12). Los Angeles, CA: Center for Language Education and Research.
- Peyton, Joy Kreeft. 1987. Dialogue Journal Writing with Limited English Proficient Students (Educational Report No. 7). Los Angeles, CA: Center for Language Education and Research.
- Peyton, Joy Kreeft, and Mulugetta Seyoum. 1988. The Effect of Teacher Strategies on Students' Interactive Writing:

The Case of Dialogue Journals (Technical Report No. 7). Los Angeles, CA: Center for Language Education and Research.

Rhodes, Nancy C., and Rebecca L. Oxford. 1988. A National Profile of Foreign Language Instruction at the Elementary and Secondary School Levels (Technical Report No. 6). Los Angeles, CA: Center for Language Education and Research.

Snow, Catherine E., Herlinda Cancino, Paulina Gonzalez, and Elizabeth Shriberg. 1987. Second Language Learners' Formal Definitions: An Oral Language Correlate of School Literacy (Technical Report No. 5). Los Angeles, CA: Center for Language Education and Research.

Snow, Marguerite A. 1987a. Innovative Second Language Education: Bilingual Immersion Programs (Educational Report No. 1). Los Angeles, CA: Center for Language Education and Research.

Snow, Marguerite A. 1987b. Immersion Teacher Handbook (Educational Report No. 10). Los Angeles, CA: Center for Language Education and Research.

Snow, Marguerite A. 1987c. Common Terms in Second Language Education (Educational Report No. 2). Los Angeles, CA: Center for Language Education and Research.

Snow, Marguerite A., and Donna M. Brinton. 1988. The Adjunct Model of Language Instruction: Integrating Language and Content at the University (Technical Report No. 8). Los Angeles, CA: Center for Language Education and Research.

Valadez, Concepcion M., Amado M. Padilla and Mario D. Chang. Beginning to Read among Monolingual and Bilingual Children (Educational Report No. 16). Los Angeles, CA: Center for Language Education and Research.

Valadez, Concepcion M. and Clementina P. Gregoire. Selecting Instructional Materials for Language Minority Students: A Materials Analysis Inventory (Educational Report No. 17). Los Angeles, CA: Center for Language Education and Research.

Valadez, Concepcion M. and Clementina P. Gregoire. Curriculum Design Development in Effective School Districts, A Case Study from Southern California (Educational Report No. 18). Los Angeles, CA: Center for Language Education and Research.

Valadez, Concepcion M. and Clementina P. Gregoire. Forthcoming. Professional Development Models for Instructors of Language Minority Students (Educational Report No. 19). Los Angeles, CA: Center for Language Education and Research.

Valadez, Concepcion M., and Buenaventura Torres-Ayala. Towards a Prototype Reading Development Program for Language Minority Students (Educational Report No. 20). Los Angeles, CA: Center for Language Education and Research.

Willetts, Karen F. 1986. Integrating Language and Content Instruction (Educational Report No. 5). Los Angeles, CA: Center for Language Education and Research.

CLEAR Publications are available from:
ERIC Document Reproduction Service
3900 Wheller Avenue
Alexandria, VA 22304-6409
1-800-227-3742

CENTER FOR POLICY RESEARCH IN EDUCATION

The Eagleton Institute of Politics
Rutgers, The State University of New Jersey
Wood Lawn - Douglass Campus
New Brunswick, New Jersey 08901
(201) 828-3872

Director: Susan Fuhrman

Affiliated Institutions: Michigan State University, Stanford
University, and University of
Wisconsin-Madison.

MISSION:

The Center produces research that (1) is useful to policymakers and their constituents; (2) focuses on the relationships between policy and teaching, learning, school organization and student performance; (3) strengthens the connections among policy, practice and performance; (4) provides information about a range of policy approaches to influence educational practice; (5) contributes to theory and knowledge about which policies work best under which circumstances and (6) fosters a continuing and strengthened dialogue between the producers and consumers of research.

Programs of Research

Principal Investigators

Curriculum and Student Standards

Bill Clune

Teacher Policies

Gary Sykes

Monitoring and Indicators

Craig Richards

New Roles and Responsibilities

Dick Elmore

Evolution of Reform

Susan Fuhrman

OERI Center Liaison: James Fox
Office of Research
Office of the Director
(202) 357-6079

Major Research Findings

- o Raising student standards was the most popular type of policy intervention in the recent wave of education reform. CPRE is conducting a longitudinal study of education reform. Forty-five states modified graduation requirements; 42

states added requirements in math, science or both. Other ways of raising student standards include new tests for graduation, increasing the length of the school day, and minimum grade point averages for graduation and or participation in extra-curricular activities.

- o Graduation requirement reforms appear to be less dramatic in practice than examinations of legislative reform would indicate. Most local districts (in the six states subjected to intense examination by this Center) were already meeting most of the new state requirements.
- o Nonetheless, school-level respondents report that, as a result of state reforms, more students are taking courses in academic subject areas and fewer students are taking such courses as vocational education, business education and, in some cases, art and music. The typical response to the new graduation requirements was the addition of 4 sections in math and 5 sections in science. In mostly-urban schools affected by the requirements, approximately 27 percent of the typical high school cohort is taking an extra math class; approximately 34 percent is taking an additional science class. However, even though the new courses added are in major academic areas, they have not been academic. They have generally been basic or remedial, with titles like "Math Applications" and have been intended for the non-college bound.
- o Increases in student standards present both benefits and hazards for at-risk students. Practitioners report that higher course requirements, and related reforms like minimum grade point averages, make graduation a more difficult goal for at-risk students and limit the time available for remediation and retaking failed courses. These effects depend strongly on the responses of individual schools, for example, on whether schools have a five-period or seven-period day, and on how schools counsel such students.
- o Reforms relating to teacher certification and compensation have been varied and extensive. More than 1,000 bills relating to these topics have been introduced in state legislatures during the 1980s. Policies to influence the teacher workforce and the quality of teaching are marked by complexity and ambiguity. Broadly speaking, policy in this area seeks to influence four matters--the supply, composition, distribution and disposition of the teacher workforce. Pursuing these four goals leads to conflict among policies and among the priorities assigned by different constituencies to these goals. For example, the imperative to raise standards for entry into teaching clashes with the

imperative to supply enough teachers and establishing legally defensible, cost-efficient entry standards collides with efforts to distinguish levels of excellence for advancement. Evidence suggests that states attempt to pursue these goals simultaneously. In the absence of state-level resolution of potential contradictions and the development of coherent strategies, responsibility for dilemma management is delegated to lower levels of the system, allowing local variation and flexibility in response to multiple, conflicting priorities.

- o By 1986, 27 states had implemented policies requiring that certain levels of proficiency be demonstrated prior to admission to a college or university teacher education program and approximately two-thirds of the states had a specific program of student requirements for teacher certification. All but four states had mandated teacher competency tests in either basic skills, subject matter knowledge or professional knowledge.
- o During the 1980s teacher compensation also changed dramatically, reflecting policymakers' concerns over the capacity of public schools to attract and retain talented teachers. After steep declines throughout the 1970s, teacher salaries have increased substantially in the past several years, in part, as a result of local pay increases and, in part, as a result of state legislation. At least thirteen states authorized across-the-board salary increases for all teachers. In at least 30 states, minimum starting salaries have been established.
- o During the 1980s the states became quite active in developing, piloting and implementing programs that compensate teachers based on performance standards. In early 1983, no state-wide programs were sponsored for paying teachers on the basis of performance. By late 1986, all but seven states had considered one of several types of performance-based compensation systems--either a merit pay career ladder, master teacher, mentor teacher or incentive pay program.
- o In the so-called first wave of state reforms, largely characterized by increased reliance on mandates and inducements around curricular intensification and improving the teacher workforce, changes in state-district roles followed two dominant patterns: (a) states assumed a greater role in specifying and monitoring expected performance at the district and school levels, which has resulted in a stronger state role; but (b) for a significant proportion of districts, this increase in state role did not result in a diminution of local influence or initiative,

rather it provided the occasion for increased local initiative and entrepreneurship.

- o In the so-called second wave of reform, largely characterized by state support for restructuring, researchers have found a tendency for states to leap-frog, or bypass to the extent possible, local district organizations in favor of dealing directly with school-level actors -- teachers, administrators and parents. Similarly, district administrators are tending to bypass their own middle management, including area administrators and instructional support staff, in favor of dealing with school-level actors.
- o Current proposals to restructure schools take their point of departure from at least three perspectives (1) the technical perspective which suggests that schools can be improved if teachers adopt and use new teaching techniques and techniques of instruction; (2) the professional perspective, which suggests that schools can be improved if teachers working conditions are improved to permit greater discretion and collegial interaction; and (3) the client perspective, which suggests that schools can be improved by increasing their responsiveness to clients and constituents.

Selected Accomplishments

- o CPRE sponsored a comprehensive survey of programs to improve education in urban areas. The study examined the promises and pitfalls of several different types of approaches such as improving curricula, changing the structure of schooling (e.g., magnet schools, staff autonomy), expanding early childhood education, providing support systems (e.g., dropout prevention programs) and bringing additional resources into the schools. Based on this survey, the study recommended a number of promising strategies including: (1) reorganizing classroom teaching and learning to promote children's positive self-perceptions, effort and school performance, (2) providing real-life incentives for urban children to achieve at school and (3) coordinating with other institutions and agencies to provide opportunities beyond the reach of the school.
- o CPRE sponsored an investigation of early childhood education. This study presents a framework for policymakers to consider when designing programs for preschool youth. It sets the debate between those who favor programs emphasizing developmental play versus those who support preschool academic programs. The report analyses various cost

considerations, noting, for example, that the average salary for childcare teachers is about half the average salary of elementary school teachers. The study notes that the two major factors affecting cost are teacher salary and class size. The report also discusses alternative funding sources such as the regular state aid formula (NJ, PA), matching grants (TX) and the project grants employed by a number of states. The work also offers recommendations for states to employ to maintain quality programs. The report recommends, for example, that childcare teachers be certified in early childhood education and the state provide technical assistance, workshops and access to experts in the field. The report and accompanying policy brief have been widely circulated. The governor's office, legislature or state education agency in seven states (OH, ME, NE, WY, RI, VA, OK) have requested multiple copies for use in study commissions or conferences on the development of early childhood policy.

- o To date, CPRE has conducted five regional workshops serving more than 270 state and local policymakers and practitioners from 25 states. Participants included local superintendents and board members, teacher and parent-teacher representatives, state department of education and state legislative staff, chief state school officers, state board members, governors aides and state legislators. These workshops, co-sponsored with OERI's regional labs, covered such topics as "Assessing Education Reform," "The Costs and Benefits of Education Reform," "The Challenge of Curriculum Reform and "Changing Roles for Schools, Districts and States." As a result of workshops, policymakers in at least eight of the states (PA, KS, MS, NE, CT, MS, LA, and IL) planned continued meetings to address issues discussed at the workshops. CPRE also has co-sponsored policymaker meetings with organizations such as the Danforth Foundation and the National Governors' Association.
- o Center work has appeared in a number of important publications. For example, a collection of CPRE papers on education indicators was published in the March 1988 issue of the Phi Delta Kappan. This magazine, with a circulation of 148,000, is one of the most widely read education publications. A set of CPRE papers on the "The Next Generation of Policy Research," was published in the Summer 1987 issue of Educational Evaluation and Policy Analysis. In addition, the National Governor's Association published a condensed version of a CPRE paper (Choice in Public Education) as one issue of its newsletter, Capital Ideas. Also, The National Association of State Boards of Education sent out copies of a CPRE report (on early childhood

education) to its members and to state education agency staff and published an article on the report in one of its newsletters; and The National Association of Secondary School Principals published a version of CPRE's policy brief on student standards in the March 1989 issue of their magazine which has a circulation of over 40,000.

- o Over the three years of the Center's existence, Center staff have discussed their work with a total audience of more than 9,000 policymakers, practitioners and researchers including governors, governors' aides, legislators and their staff, chief state school officers, members of state and local school boards, state agency personnel, state representatives of teacher associations, executives of associations representing public and private schools, local district practitioners, and education writers.

Publications

Books and Articles

- Brandl, John E. 1986. "Toward Being Through with Muddling." Paper presented at the annual CPRE Policy Forum, Cambridge, MA, December 11-12.
- Clune, William H. 1988. "Research Issues from Three Views of Curriculum Policy in the School Context: The School as Policy Mediator, Policy Critic and Policy Constructor." Paper presented at a conference, The Impact of Reform on Secondary-School Context, Michigan State University, East Lansing, MI, April 19-20.
- Clune, William H. 1987. "Institutional Choice as a Theoretical Framework for Research on Educational Policy Making." Educational Evaluation and Policy Analysis 9, no. 2 (Summer): 117-132.
- Cohen, Michael. 1987. "Restructuring the Education System: Agenda for the '90s." Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Cohen, David K. 1987. "Educational Technology: The Next Generation of Policy and Research Issues." Educational Evaluation and Policy Analysis 9, No. 2 (Summer): 153-170.
- David, Jane L. (with the assistance of Stuart Purkey and Paula A. White). 1989. "Restructuring in Progress: Lessons from Pioneering Districts." Washington, DC: National Governors' Association.

- David, Jane L. 1988. "District Uses of Indicators: Aid or Threat to Improvement?" Phi Delta Kappan, March, 499-503.
- Elmore, Richard F. 1989. "Early Experience in Restructuring Schools: Voices from the Field." Washington, DC: National Governors' Association.
- Elmore, Richard F. Forthcoming b. "Models of Restructured Schools." In New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Elmore, Richard F. 1988. "Contested Terrain: The Next Generation of Educational Reform." Prepared for the Commission on Public School Administration and Leadership of the Association of California School Administrators.
- Elmore, Richard F. 1986. "Instruments and Strategy in Public Policy." Paper presented at the Midwest Political Science Association Meeting, Chicago, IL, April 9.
- Firestone, William A. Forthcoming. "Continuity and Incrementalism After All: State Responses to the Excellence Movement." In The Educational Reform Movement of the 1980s: Perspectives and Cases, edited by Joseph Murphy. Berkeley, CA: McCutchan.
- Fuhrman, Susan H. 1988. "State Politics and Education Reform" In The Politics of Reform and School Administration, 1988 Yearbook of the Politics of Education Association, edited by Robert Crowson and Jane Hanaway. New York: Falmer Press. (Also published in The Journal of Educational Policy.)
- Fuhrman, Susan, William Clune and Richard Elmore. 1988. "Research on Education Reform: Lessons on the Implementation of Policy." In Resource Allocation Issues in Education Reform, 1988 Yearbook of the American Educational Finance Association, edited by D. Monk and J. Underwood. Cambridge, MA: Ballinger. (Also published in Teachers College Record.)
- Gideonse, Hendrik, D. 1987. "Practitioner-Oriented Inquiry by Teachers: Meaning, Justification and Implications for School Structure " Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Hanaway, Jane. 1988. "School Autonomy and Sources of Revenue: An Empirical Analysis of Policy Conflicts." Paper presented at a conference, The Impact of Reform on Secondary-School Context, Michigan State University, East Lansing, MI, April 19-20.

- Hetrick, Beverly, and Carl E. Van Horn. 1988. "Educational Research Information: Meeting the Needs of State Policymakers." Theory into Practice 27, no. 2 (Spring): 106-110. (A condensation will appear in Education Digest.)
- Johnson, Susan Moore. 1987. "On Giving Professional Reform a Chance." Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Kirst, Michael W. 1988. "The Internal Allocations of Resources Within U.S. School Districts: Implications for Policymakers and Practitioners." In Resource Allocation Issues in Education Reform, 1988 Yearbook of the American Educational Finance Association, edited by D. Monk and J. Underwood. Cambridge, MA: Ballinger.
- First, Michael W. 1988a. "The Politics of School Finance: Implications for Research." Paper presented at a conference, Economics and School Finance: Research Agenda for Public Education for the 1990s, University of Southern California, Los Angeles, CA, June 9-10.
- Kirst, Michael W. 1988b. "Recent State Education Reform in the United States: Looking Backward and Forward." Educational Administration Quarterly 24, no. 3 (August).
- Kirst, Michael W. 1988c. "Who Should Control Our Schools?" In Schooling for Tomorrow: Directing Reforms to Issues that Count? edited by Thomas Sergiovanni. Boston: Allyn and Bacon. (Also published in NEA Today, Issues '88 [March].)
- Levin, Henry M. 1988. "Cost-Effectiveness and Educational Policy." Educational Evaluation and Policy Analysis 10, no. 1 (Spring): 51-69.
- McDonnell, Lorraine M. 1987. "The Instruments of State Education Reform." Paper presented at the Western Political Science Association Annual Meeting, Anaheim, CA, March 26-28.
- McLaughlin, Milbrey. 1987. "Lessons from Past Implementation Research." Educational Evaluation and Policy Analysis 9, no. 2 (Summer): 171-178.
- Murnane, Richard J. 1987. "Improving Education Indicators and Economic Indicators: The Same Problems?" Educational Evaluation and Policy Analysis 9, no. 2 (Summer): 101-116.

- Murnane, Richard J. and Edward W. Pauly. 1988. "Lessons from Comparing Education Indicators and Economic Indicators." Phi Delta Kappan, March, 509-513.
- National Governors' Association. "Choice in Public Education." Capital Ideas HR.87.11 (August).
- Peterson, Penelope L. 1989. "Alternatives to Student Retention: New Images of the Learner, the Teacher, and Classroom Learning." In Flunking Grades: Research and Policies on Grade Retention, edited by L.A. Shepard and M.L. Smith. New York: Falmer Press.
- Peterson, Penelope L. 1988. "New Roles and Classroom Practice." Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA, April 5.
- Peterson, Penelope L. 1987. "Teaching for Educational Excellence: The Challenge is Now." Paper presented at Indiana University's annual education conference, Bloomington, IN, April 8.
- Peterson, Penelope L. and Michelle A. Comeaux. 1989. "Assessing the Teacher as a Reflective Professional: New Perspectives on Teacher Evaluation, 132-152." In Beyond Debate: Research Perspectives on the Graduate Preparation of Teachers, edited by Anita W. Woolfolk. Englewood Cliffs, NJ: Prentice-Hall.
- Porter, Andrew C. 1988a. "External Standards and Good Teaching: The Pros and Cons of Telling Teachers What to Do." Paper presented at a conference, The Impact of Reform on Secondary-School Context, Michigan State University, East Lansing, MI, April 19-20.
- Porter, Andrew C. 1988b. "Indicators: Objective Data or a Political Tool?." Phi Delta Kappan, March, 503-508.
- Raywid, Mary Anne. 1987. "Restructuring School Governance: Two Models." Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Richards, Craig. 1988a. "Indicators and Three Types of Educational Monitoring Systems: Implications for Design." Phi Delta Kappan, March, 495-498.
- Richards, Craig E. 1988b. "A Typology of Educational Monitoring Systems." Educational Evaluation and Policy Analysis 10, no. 2 (Summer): 106-116.

- Richards, Craig E. and Mwalimu J. Shujaa. 1988. "Organizational Learning Cultures and Educational Accountability: Revisiting the Dropout Problem." Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 5-9.
- Rowan, Brian. 1987. "The Technology of Teaching and School Reform." Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Selden, Ramsay. 1988. "Better Data on Education." Phi Delta Kappan, March, 492-594.
- Smith, Marshall S. 1988. "Educational Indicators." Phi Delta Kappan, March, 487-491.
- Sykes, Gary. 1988. "Policy Effects on Teacher Supply, Quality and Careers." Paper presented at a conference, The Impact of Reform on Secondary-School Context, Michigan State University, April 19-20.
- Sykes, Gary. 1987. "Professionalism and Teaching." Paper presented at the annual CPRE Policy Forum, Washington, DC, November 12-13. (To appear in New Models of Schooling, edited by Richard F. Elmore. Forthcoming. San Francisco: Jossey-Bass.)
- Sykes, Gary. 1988. "Interim Report on State Teacher Policies." Paper presented at CPRE Policy Retreat, Elkridge, MD, June 1-3.
- Sykes, Gary and Richard F. Elmore. 1988. "Making Schools Manageable: Policy and Administration for Tomorrow's Schools." In The Politics of Reform and School Administration, 1988 Yearbook of the Politics of Education Association, edited by Robert Crowson and Jane Hanaway. New York: Falmer Press. (Also to appear in the Journal of Education Policy.)
- Walberg, Herbert J. 1986. "Efficiency and Trade-Offs in Education." Background paper for research on efficiency in schooling.
- White, Sheldon H. 1986. "Three Visions of Child Psychology and Their Influence on Schooling." Paper presented at the annual CPRE Policy Forum, Cambridge, MA, December 11-12.
- Wohlstetter, Priscilla. 1988. "Oversight of State Education Reforms: The Motivations and Methods of Program 'Fixers'."

Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA, April 5-9.

Center Publications

Bryk, Anthony S. and Yeow Meng Thum. 1989. "The Effects of High School Organization on Dropping Out."

Calfee, Robert. 1988. Indicators of Literacy.

Clune, William H. (with the assistance of Paula A. White and Janice H. Patterson). 1989. "The Effects of High School Graduation Requirements: First Steps Toward Curriculum Reform."

Clune, William H., and Paula White. 1988. School-Based Management: Institutional Variation, Implementation, and Issues for Further Research.

Darling-Hammond, Linda and Barnett Berry. 1988. The Evolution of Teacher Policy.

David, Jane L. 1987. Improving Education with Locally Developed Indicators.

Elmore, Richard F. Forthcoming a. "Leadership and Policy in Education." (submitted for journal publication)

Elmore, Richard F. Forthcoming b. "Working Models of Choice."

Elmore, Richard F. 1986. Choice in Public Education. (also published in The Politics of Excellence and Choice in Education, edited by William Boyd and Charles Kerchner. 1988. New York: The Falmer Press.

Farrar, Eleanor. 1988. The Boston Compact: A Teaching Case.

Firestone, William A. Forthcoming. "Using School Reform for School Improvement." (submitted for journal publication)

Goertz, Margaret E. Forthcoming. "Coursetaking Patterns in the Fourth, Eighth, and Eleventh Grades: An Analysis of the 1983-84 National Assessment of Educational Progress."

"Graduating From High School--New Standards in the States." 1989. CPRE Policy Briefs.

Grubb, Norton W. 1987. Young Children Face The States: Issues and Options for Early Childhood Programs.

- Guthrie, John, T. 1987. Indicators of Reading Education.
- Hanson, Thomas. Forthcoming. "Curricular Change in Dade County: 1982-83 to 1986-87 a Replication of the Pace Study."
- Levin, Henry M. 1988. Accelerated Schools for At-Risk Students.
- McDonnell, Lorraine M. and Richard Elmore. 1987. Alternative Policy Instruments. (Also published as "Getting the Job Done: Alternative Policy Instruments." Educational Evaluation and Policy Analysis 9, no. 2 (Summer): 133-152.)
- McDonnell, Lorraine M. and Anthony Pascal. 1988. Teacher Unions and Educational Reform.
- "New Perspectives on Teacher Evaluation." Forthcoming. CPRE Policy Briefs.
- Oakes, Jeannie. 1987. Improving Urban Schools: Possibilities and Problems in Current District Reforms.
- Oakes, Jeannie. 1986. Educational Indicators: A Guide for Policymakers.
- Patterson, Janice H. Forthcoming. "Computers in Schools: State Policy Objectives and Policy Instruments."
- Patterson, Janice H., and Patricia Williams. Forthcoming. "Computer Education Reform: An Analysis of Local Effects."
- "Programs for Young Children: State Policy Options." 1987. CPRE Policy Briefs.
- Raizen, Senta A. 1988. Increasing Educational Productivity through Improving the Science Curriculum.
- Smith, Marshall S. and Jennifer O'Day. Forthcoming. "Teacher Policy and Research on Teaching."
- Romberg, Thomas A. 1988. Changes in School Mathematics: Curricular Changes, Instructional Changes, and Indicators of Change.
- Van Horn, Carl and Beverly Hetrick. Forthcoming. "Buyers and Brokers: Information Flow in Education Policy Communities." (submitted for journal publication)
- White, Paula A. 1988. Resource Materials on School-Based Management.
- Williams, Patricia A. 1987. Standardizing School Dropout Measures.

Publications of the Center for Policy Research in Education may be obtained by contacting:

Lynn McFarlane
Assistant Director for Communications
Center for Policy Research in Education
Eagleton Institute of Politics
Rutgers University
New Brunswick, NJ 08901

There is a nominal fee for some Center publications.

CENTER FOR RESEARCH ON ELEMENTARY AND MIDDLE SCHOOLS

Johns Hopkins University
3505 North Charles Street
Baltimore, Maryland 21218
(301) 338-7570

Co-Directors: James McPartland
Edward McDill

Mission

The mission of the Center for Research on Elementary and Middle Schools is to produce useful knowledge about how elementary and middle schools can foster growth in students' learning and development. The work of the Center is designed to produce (a) better scientific understanding of how elementary and middle schools can foster student learning of academic knowledge and skills and student development of valued personal characteristics such as strong self-concept, civic values, and independence, (b) research-based practical methods for improving the effectiveness of elementary and middle schools, and (c) specific strategies for implementing effective research-based school and classroom practices.

Programs of Research

Program on Effective Elementary
Schools

Program on Effective Middle
Schools

Program on School Improvement

Principal Investigators

Robert Slavin
Nancy Karweit
Henry Becker
Robert Stevens

Joyce Epstein
James McPartland

Gary Gottfredson
Denise Gottfredson

OERI Center Liaison: Rene Gonzalez
Office of Research
Schools and School Professionals Division
(202) 357-6207

Major Research Findings

- o Assigning students to self-contained classes according to general ability or performance level does not enhance student achievement. Grouping methods which do show positive effects on student achievement include within-

class ability grouping in mathematics, regrouping classes for reading across grade levels (the Joplin plan), and grouping which places students in flexible groups based on their performance (nongraded plans).

- o Full-day kindergarten, compared to half-day, benefits the academic achievement of under-achieving and disadvantaged children.
- o About 85 percent of schools that include a first grade assign first-grade teachers to self-contained classrooms. This percentage declines regularly as the grade level increases, and reaches zero percent at grade 7 and above. Conversely, departmentalized assignments do not appear until grade 4, but increase regularly to become the dominant practice in grade 7 and above.
- o Departmentalized staffing may weaken teacher-student relationships while strengthening instructional quality in more specialized subjects such as science and social studies.
- o School practices of staffing, scheduling, and grouping -- and thus the school's emphasis on either meeting curriculum requirements or promoting student development, are heavily influenced by grade span. Schools with the lower top grade (e.g., K-4) are more likely to resemble the typical elementary school, while schools with the higher top grade (e.g., K-8) are more likely to resemble the typical secondary school.
- o Tracked mathematics classes seem to benefit high background students but not low background students, especially sixth graders in middle schools. But in elementary schools, tracking in reading is advantageous for low background students.
- o Computer-assisted instruction systems of the 60's and 70's were generally more effective in raising students' scores on standardized achievement tests than were alternative approaches -- but these systems have all but disappeared with the advent of the desktop microcomputer.
- o Teachers see computers as primarily helping students enjoy their school experiences more and motivating them to pay attention to their academic work. But experimental studies of computer use in schools provide little evidence of computer effectiveness for increasing student achievement.
- o The type of mastery learning used most commonly in elementary and secondary schools -- group-based mastery

learning -- has no effects on students' achievement on standardized achievement tests. And the effects of group-based mastery learning on experimenter-made tests, designed to specifically test knowledge of the material being taught, are generally positive but not large and may not be maintained over time.

- o A number of specific programs have been identified which offer convincing evidence that they improve the academic achievement of children who are at risk of school failure. These include kindergarten programs, in-class elementary programs, and pull-out programs. In short, the instructional programs are available right now for school districts to launch a long-term program that will improve the academic performance of most at risk students.
- o Teacher practices that focus on getting parents to help their children with schoolwork at home are the most likely form of parent involvement to improve student achievement in school.
- o The organizational structures and teaching practices of grades 6-8 schools (middle schools) still highly resemble the organizational structures and teaching practices of grades 7-9 schools (junior high schools), but some movement is occurring toward more balanced structures and teaching activities that are theoretically linked to positive early adolescent development.

Selected Accomplishments

- o The Center has developed a program of cooperative learning that has been adopted in more than 30,000 classrooms throughout the United States.
- o Center staff have identified effective programs for students at risk of school failure and produced a Sourcebook that describes these programs plus other research on achievement of at-risk students.
- o The Center developed a model of elementary schooling (Success For All) based on the premise that all -- not just some or most -- elementary school students will learn the basic skills necessary for later success by the end of the sixth grade. Testing of the model, shows significant gains in reading and associated skills.
- o The Center developed a set of research-based materials on middle school organization and instructional practice that identifies major components of middle school organization (grade span, scheduling, grouping, tracking), identifies

the strengths and weaknesses of each, and provides suggestions for how middle schools can balance these factors to meet their dual goals of student achievement and social development.

- o Center staff provided a set of research-based information on school uses of microcomputers that identified the extent of microcomputer use in schools nationwide. The Center conducted a synthesis of research which concluded that microcomputer use in schools is extensive but disjointed and ineffective at present in improving student achievement.
- o The Center developed a five-category typology of parent involvement in schooling used by schools and districts to plan their parent involvement programs. Center staff developed the Teachers Involve Parents in Schoolwork (TIPS) process for teachers to use to maintain home/school communication and actively solicit parent support in homework activities.
- o Center staff identified the basic components of the principal's job at elementary and secondary levels to provide a research base for developing training modules in areas identified as essential.
- o The Center collaborated extensively with a large urban school district to implement research-based innovations, and they used this experience to contribute to the literature and our understanding of the school change process.

Publications

Books and Articles

- Alexander, K.L. 1987. "Comparing public and private school effectiveness: Evidence and issues." Pp. 33-66 in E. H. Haertel, T. James and H. M. Levin (eds.), Comparing Public and Private Schools, Vol. 2: School Achievement. New York: The Falmer Press.
- Alexander, K.L. and D.R. Entwisle. In Press. "Educational achievement in grades one and two." Monographs of the Society for Research in Child Development.
- Alexander, K.L., D.R. Entwisle, D. Cadigan and A.M. Pallas. 1987. "Getting ready for first grade: Standards of deportment in home and school." Social Forces 66: 57-84.
- Alexander, K.L., D.R. Entwisle, and M.S. Thompson. 1987. "School performance, status relations and the structure of sentiment:

bringing the teacher back in." American Sociological Review 52: 665-682.

Alexander, K.L., S. Holupka and A.M. Pallas. 1987. "Social background and academic determinants of two-year and four year knowledge attendance: Evidence from two cohorts a decade apart." American Journal of Education 96: 56-80.

Alexander, K.L., G. Natriello and A.M. Pallas. 1985. "For whom the school bell tolls: The impact of dropping out on cognitive performance." American Sociological Review 50:409-420.

Alexander, K.L. and A.M. Pallas. 1986. "Reply to Hauser and Sewell." Social Forces 65: 250-257.

Alexander, K.L. and A.M. Pallas, and S. Holupka. 1987. "Consistency and change in educational stratification: Recent trends regarding social background and college access." Pp. 161-185 in R.V. Robinson (ed.) Research in Stratification and Mobility, Vol. 6. JAI Press.

Becker, H.J. 1985. "The computer and the elementary school." Principal 64: 32-35.

Becker, H.J. 1985. "How schools use microcomputers: Results from a national survey." In Milton Chen and William Paisley (eds.), Children and Microcomputers: Research on the Newest Medium. Sage Publications.

Becker, H.J. 1985. "Men and women as computer-using teachers." Sex Roles 13: 137-148 (special issue on "Girls, Women, and Computers").

Becker, H.J. 1985. "The classroom context of microcomputers: How different schools manage the problems." Journal of Mathematical Behavior 4: 69-82.

Becker, H.J. 1986. "Computers and the Holy Grail," address before the National Governors' Association Task Force on Technology in Education, Washington, D.C. January 10, 1986. Reprinted, with various titles, in the Baltimore Sun and the Cleveland Plain Dealer, February 2, 1986.

Becker, H.J. 1986. "Our national report card: preliminary results from the New Johns Hopkins Survey." Classroom Computer Learning 6: 30-33.

Becker, H.J. 1987. "National field studies of school computers." The Computing Teacher 14: 28.

Becker, H.J. 1987. "The importance of a methodology that maximizes falsifiability: Its application to research about logo." Educational Researcher 16: 11-16.

Becker, H.J. 1987. "Using computers for instruction." Byte Magazine 12: 149-162.

Becker, H.J. and C.W. Sterling. 1987. "Equity in school computer use: National data and neglected considerations." Journal of Educational Research 3: 289-311.

Braddock, J. H., II. 1985. "School desegregation and black assimilation." Journal of Social Issues 41: 9-22.

Braddock, J.H., II. 1986. "The white shadow syndrome: Institutional discrimination in professional football." In A. Gilmore (ed.), The History and Politics of the Black Athlete in America. Westport, CT: Greenwood.

Braddock, J.H., II., R.L. Crain, J.M. McPartland and R.L. Dawkins. 1986. "Applicant race and job placement decisions: A national survey experiment." International Journal of Sociology and Social Policy 6:3-24.

Braddock, J.H., II and J.M. McPartland. 1987. "Some cost and benefit considerations for black college students attending predominantly white and predominantly black universities." In M. Nettles (ed.), The Black Experience in American Higher Education. Westport, CT: Greenwood.

Braddock, J.H., II and J.M. McPartland. 1987. "How minorities continue to be excluded from equal employment opportunities: Research on labor market and organizational barriers." Journal of Social Issues 43: 5-39.

Braddock, J.H., II and J.M. McPartland. 1987. "Social science evidence and affirmative action policies: A response to the commentators." Journal of Social Issues 43: 133-143.

Braddock, J.H., II and J.M. McPartland. 1987. "More evidence on Social-Psychological processes that perpetuate racial segregation: The relationship of school segregation and employment segregation." Journal of Black Studies.

Braddock, J.H., II, and J.M. McPartland. 1988. "The social academic consequences of school desegregation." Equity and Choice 4: 5-10.

Braddock, J.H., II, and J.M. McPartland. 1988. "Some cost benefit considerations for black college students attending predominantly white versus black universities." Pp. 87-104 in Nettles, M.T. (ed.), Toward Black Undergraduate Student

Equality in American Higher Education. New York: Greenwood Press.

Cadigan, D., D.R. Entwisle, K.L. Alexander, and A.M. Pallas. 1988. "Who is promoted out of first grade?" Merrill-Palmer Quarterly 324: 71-88.

Dawkins, M.P., J.H. Braddock, II and C.D. Green. 1986. "The effect of marginal occupational status on psychological well-being." Journal of Social and Behavioral Sciences 32: 93-105.

Entwisle, D.R. and K.L. Alexander. 1988. "Early schooling as a 'critical period' phenomenon." In K. Namboodiri and R.G. Corwin (eds.), Sociology of Education and Socialization, Vol. 8. Greenwich, CT: JAI Press.

Entwisle, D.R. and K.L. Alexander. 1988. "Long-term effects of cesarean delivery on parents' beliefs and children's schooling." Developmental Psychology 23: 676-682.

Entwisle, D.R. and K.L. Alexander. 1988. "Beginning school math competence." Under review, Child Development.

Entwisle, D.R. and K.L. Alexander, K.L. 1988. "Factors affecting achievement test scores and marks received by black and white first graders." The Elementary School Journal 88: 449-471.

Entwisle, D.R. and K.L. Alexander. In Press. "Children's transition into full-time schooling." Under review, American Journal of Sociology.

Entwisle, D.R., K.L. Alexander, D. Cadigan and A.M. Pallas. 1986. "The schooling process in first grade: two samples a decade apart." American Educational Research Journal 23: 587-613.

Entwisle, D.R., K.L. Alexander, D. Cadigan and A.M. Pallas. 1987. "Kindergarten experience: Cognitive effects or socialization?" American Educational Research Journal 24: 337-364.

Entwisle, D.R., K.L. Alexander, A.M. Pallas and D. Cadigan. 1987. "The emergent academic self-image of first graders: its response to social structure." Child Development 58:1190-1206.

Entwisle, D.R., K.L. Alexander, A.M. Pallas and D. Cadigan. 1988. "A social psychological model of the schooling process over first grade." Social Psychology Quarterly. In Press.

- Epstein, J.L. Book Review: 1985. "Sex differentiation and schooling," by M. Marland (ed.). Contemporary Sociology 14: 479-480.
- Epstein, J.L. 1985. "A question of merit: Principals' and parents' evaluations of teachers." Educational Researcher 14 (7): 3-10.
- Epstein, J.L. 1985. "After the bus arrives: Resegregation in desegregated schools." Journal of Social Issues 41(3): 23-44.
- Epstein, J.L. 1985. "Reply to Barr and Dreeben on 'How Schools Work'." Contemporary Sociology 14: 7.
- Epstein, J.L. 1985. "Home and school connections in schools of the future." Peabody Journal of Education 62(2): 18-41.
- Epstein, J.L. 1986. "Parents' reactions to teacher practices of parent involvement." The Elementary School Journal 86: 277-294.
- Epstein, J.L. 1986. "Parent involvement: Implications for limited english proficient (LEP) parents." In Issues of Parent Involvement and Literacy, Proceedings of the Trinity College Symposium. Washington, DC: Trinity College.
- Epstein, J.L. 1986. "Friendship selection: Developmental and environmental influences." In E. Mueller and C. Cooper (eds.), Process and Outcomes in Peer Relations. New York: Academic Press.
- Epstein, J.L. Book Review: 1987. "The family and the school: A joint systems approach to problems with children," by E. Dowling and E. Osborne (eds.). Contemporary Sociology 16 (4) (September): 740-742.
- Epstein, J.L. 1987. "Toward a theory of family-school connections: Teacher practices and parent involvement across the school years. Pp. 121-136 in K. Hurrelmann, F.X. Kaufmann, and F. Losel (eds.), Social Intervention: Potential and Constraints. New York: DeGruyter/Aldine.
- Epstein, J.L. 1987. "What principals should know about parent involvement." Principal (January): 6-9.
- Epstein, J.L. 1987. "Parent involvement for student and family success: State policy school practice, and community education programs." Community Education Journal 14: 4-10.

- Epstein, J.L. Book Review: 1987. "Adolescent relations with mothers, fathers, and friends," by J. Youniss and J. Smoller. American Journal of Sociology 93 (1) (July):236-239.
- Epstein, J.L. 1987. "Teacher practices of parent involvement: What research says to administrators." Education in Urban Society 19: 119-136.
- Epstein, J.L. 1987. "Homework practices, achievements, and behaviors of elementary school students." ERS Information Folio: Homework, Educational Research Service, Arlington, VA.
- Epstein, J.L. 1988. "Parent-teacher conferences." Pp. 191-193 in R.A. Gorton, G.T. Schneider, and J.C. Fisher (eds.), Encyclopedia of School Administration and Supervision. Phoenix: Oryx Press.
- Epstein, J.L. 1988. "Effective schools or effective students: Dealing with diversity." Pp. 89-126 in R. Haskins and D. MacRae (eds.), Policies for America's Public Schools: Teachers, Equity and Indicators. Norwood, NJ: Ablex.
- Epstein, J.L. Book Review: 1988. "After the school bell rings," by C.A. Grant and C.E. Sleeter, Education Policy.
- Epstein, J.L. 1988. "Parent involvement." Pp. 189-191 in R.A. Gorton, G.T. Schneider, and J.C. Fisher (eds.), Encyclopedia of School Administration and Supervision. Phoenix: Oryx Press.
- Epstein, J.L. 1988. "How do we improve programs for parent involvement?" Educational Horizons (Guest editor for special issue) (Winter) 66: 58-59.
- Epstein, J.L. In Press. "The importance of developmental and environmental factors for the selection of friends." In T.J. Berndt and G.W. Ladd (eds.), Peer Relations in Child Development. New York: John Wiley.
- Epstein, J.L. In Press. "Effects of teacher practices of parent involvement on change in student achievement in reading and math. In S. Silvern (ed.), Literacy Through Family, Community, and School Interaction. Greenwich, CT: JAI Press.
- Epstein, J.L. In Press. "Family influence and student motivation: A developmental perspective." In C. Ames and R. Ames (eds.), Research on Motivation in Education, Vol.3. New York: Academic Press.
- Epstein, J.L. and H.J. Becker. In Press. Hopkins Surveys of Schools and Family Connections: Questionnaires for Teachers,

Parents, and Students. In J. Touliatos, B. Perlmutter, and M. Straus (eds.), Handbook of Family Measurement Techniques. Newbury Park, CA: Sage Publications.

Gottfredson, D.C. 1985. "Project PATHE: A school-based model for primary prevention of adolescent drug use. In Drug Abuse, Mental Health, and Delinquency. (Summary). Proceedings of Practitioners' Conference on Juvenile Offenders with Serious Drug, Alcohol, and Mental Health Problems. Washington, DC: Government Printing Office.

Gottfredson, D.C. 1985. "Is work beneficial to teenagers?" NASSP Bulletin 69 (478): 66-72.

Gottfredson, D.C. 1985. "Youth employment, crime, and schooling: A longitudinal study of a national sample. Developmental Psychology 21: 419-432.

Gottfredson, D.C. 1986. "An empirical test of school-based environmental and individual interventions to reduce the risk of delinquent behavior. Criminology 24: 705-731.

Gottfredson, D.C. 1987. "Examining the potential of delinquency prevention through alternative education." Today's Delinquent 6: 87-100.

Gottfredson, D.C. 1987. "An evaluation of an organization development approach to reducing school disorder. Evaluation Review 11: 739-763.

Gottfredson, D.C., L.G. Hybl, G.D. Gottfredson, and R.P. Castaneda. 1987. "School climate assessment instruments: A Review. In H.J. Freiberg, A. Driscoll, and S. Knight (eds.), School Climate (pp. 49-81). Bloomington, IN: Phi Delta Kappa.

Gottfredson, G.D. 1985. Effective School Battery: User's Manual. Odessa, FL: Psychological Assessment Resources.

Gottfredson, G.D. 1986. "Crime policy with benefit of hindsight" (Review of American Violence and Public Policy). Contemporary Psychology 31: 666-668.

Gottfredson, G.D. 1987. Using the Effective School Battery to Assess Effective Schools. Odessa, FL: Psychological Assessment Resources.

Gottfredson, G.D. 1987. "Peer group interventions to reduce the risk of delinquent behavior: A selective review and a new evaluation." Criminology 25: 1001-1043.

- Gottfredson, G.D. 1987. "Employment setting, specialization, and patterns of accomplishment among psychologists." Professional Psychology: Research and Practice 18: 452-460.
- Gottfredson, G.D. In Press. "Experiences of violent and serious victimization." In N.A. Weiner and M.E. Wolfgang (eds.), Pathways to Criminal Violence. Beverly Hills, CA: Sage.
- Gottfredson, G.D. In Press. "Socializing the children of the undeserving poor." Review of From Children to Citizens, Vol. 3: Families, Schools and Delinquency Prevention. J.Q. Wilson and G.C. Loury (eds.), Contemporary Psychology.
- Gottfredson, G.D. and D.C. Gottfredson. 1985. Victimization in Schools. New York: Plenum.
- Gottfredson, G.D. and J.H. Hollifield. 1988. "How to diagnose school climate." National Association of Secondary School Principals Bulletin 72 (506): 63-71.
- Gottfredson, G.D., M. Reiser, and C.R. Tsegaye-Spates. 1987. "Psychological help for victims of crime." Professional Psychology: Research and Practice 18: 316-325.
- Hollifield, J.H. 1986. "National associations find agreeable recipe for teacher evaluation." R & D Preview, 1 (3) (September).
- Hollifield, J.H. 1986. "How to teach writing and still have time for anything else." R & D Preview, 1 (2) (July).
- Hollifield, J.H. 1987. "Critical thinking: What's a teacher to do?" R & D Preview, 1 (4) (January).
- Howard, A., G.M. Pion, G.D. Gottfredson, P.E. Flattau, S. Oskamp, S.M. Pfafflin, D.W. Bray, and A.G. Burstein. 1986. "The changing face of American psychology." American Psychologist 41: 1311-1327.
- Karweit, N. 1985. "Should we lengthen the school term?" Educational Researcher 14 (6): 9-15.
- Karweit, N. 1985. "Time spent, time needed and adaptive instruction." In M. Wang and H. Walberg (eds.), Adapting Instruction to Individual Differences.
- Karweit, N. 1985. "Time scales, learning events and productive instruction." In C. Fisher and D. Berliner (eds.), Perspectives on Instructional Time. New York: Longman.

- Karweit, N. 1987. "Equity, standards and classroom processes." In M. Hallinan (ed.), The Social Organization of Schools. New York: Plenum Publishers.
- Karweit, N. In Press. "Time-on-task: The second time around." NASSP Bulletin.
- Karweit, N. In Press. "Quality and quantity in preprimary programs." Elementary School Journal.
- Karweit, N. and D. Kertzner. 1987. "Life course data management." In D. Kertzner (ed.), Family Relations in Life Course Perspective. JAI Press.
- Klein, S., L. Russo, C. Tittle, P. Schumuck, P. Campbell, P. Blackwell, S.R. Murray, C. Dwyer, M. Lockheed, B. Landers, and J. Simonson. 1985. "Summary and recommendations for the continued achievement of sex equity in and through education." In S. Klein (ed.), Handbook for Achieving Sex Equity through Education. Baltimore: Johns Hopkins University Press.
- Lewis, S., O. Anderson, A. Craig, N. Jackson, I. Jenkins, B. Jones, S.R. Muray, et al. 1985. "Achieving sex equity for minority women." Handbook for Achieving Sex Equity through Education. Baltimore: Johns Hopkins University Press.
- MacIver, D. 1987. "Classroom factors and student characteristics predicting students' use of achievement standards during ability self-assessment." Child Development 58: 1258-1271.
- Madden, N.A. and R.E. Slavin. In Press. "Effective pullout programs for students at risk." In R.E. Slavin, N.L. Karweit, and N.A. Madden (eds.), Effective Programs for Students at Risk. Needham Heights, MA: Allyn and Bacon.
- Madden, N.A., R.E. Slavin, N.L. Karweit, and B.J. Livermon. In Press. "Success for All: Restructuring the urban elementary school." Educational Leadership.
- McDill, E.L., G. Natriello, and A.M. Pallas. 1985. "Raising standards and retaining students: The impact of the reform recommendations on potential dropouts." Review of Educational Research 55: 415-433.
- McDill, E.L., G. Natriello and A.M. Pallas. 1985. "Contributors to Items for an agenda." Educational Research and the Reports on Excellence. Washington, DC: American Educational Research Association.
- McDill, E.L., G. Natriello, and A.M. Pallas. 1986. "A population at risk: Potential consequences of tougher school standards for school dropouts." American Journal of Education 94: 135-181.

Reprinted in G. Natriello (ed.) School Dropouts: Patterns and Policies. New York: Teachers College Press.

McDill, E.L., G. Natriello and A.M. Pallas. 1987. "The high costs of high standards: School reform and dropouts." Pp.183-209 in Center on Evaluation, Development and Research, Phi Delta Kappa (ed.), Dropouts, Pushouts, and Other Casualties. Bloomington, IN: Phi Delta Kappa. (This article is an expanded version of the article appearing immediately above.)

McPartland, J.M. and H.J. Becker. 1985. "A model for statistical research on school organization and classroom practices." Commissioned paper for the National Center for Education Statistics, U.S. Department of Education.

McPartland, J.M. and R.L. Crain. 1986. "Evaluating the trade-offs in student outcomes from alternative school organization policies." Pp. 131-156 in Maureen Hallinan (ed.), The Social Organization of Schools. New York: Plenum.

McPartland, J.M. (with Braddock, J.H., II). 1987. "How minorities continue to be excluded from equal employment opportunities: Research on labor market and institutional factors." Journal of Social Issues 43: 5-40.

McPartland, J.M. (with Braddock, J.H., II). 1987. "Social science evidence and affirmative action policies: A response to commentators." Journal of Social Issues 43:133-144.

Murray, S.R. Part V (ED.) 1985. "Overview: Sex equity strategies for specific populations." In S. Klein (ed.), Handbook for Achieving Sex Equity Through Education. Baltimore: Johns Hopkins University Press.

Murray Nettles, S.R. 1987. "Academic related behavior, black adolescence: Topical summaries and annotated bibliographies of research. Storrs, CN: Consortium for Research on Black Adolescence, University of Connecticut.

Murray, S.R. 1987. "Psychological research methods: Women in the African Diaspora." In R. Terborg - Penn, S. Harley, and A.B. Rushing (eds.), Women in Africa and the African Diaspora. Washington: Howard University Press.

Murray Nettles, S.E. 1988. "Fostering self-support: Programs in the states and cities." In M. Ackelsberg, R. Bartlett and R. Buchele (eds.), Women, Welfare and Higher Education: Toward Comprehensive Policies. Northampton, MA: Smith College (forthcoming).

- Murray Nettles, S.R. and D. Scott-Jones. In Press. "The role of sexuality as it affects sex equitable experiences of racial and ethnic minority students. Peabody Journal of Education.
- Murray Nettles, S.R. In Press. "Understanding the impact of community involvement on the achievement of disadvantaged black students." Journal of Adolescent Research.
- Murray Nettles, S.R. In Press. "Higher education as the route to self-sufficiency for low-income and women on welfare." In L.R. Wolfe (ed.), Occupational Segregation and Its Roots in Education. Washington: Center for Women Policy Studies.
- Natriello, G., E.L. McDill and A.M. Pallas. 1985. "School reform and potential dropouts." Educational Leadership 43 (1): 10-14.
- Natriello, G. and E.L. McDill. 1986. "Performance standards, student effort on homework, and academic achievement." Sociology of Education 59: 18-31.
- Natriello, G., A.M Pallas and E.L. McDill. 1986. "Community resources for responding to the dropout problem." Pp. 13-24 in The Public Education Institute (ed.), Dropping Out: Community Based Alternatives. New Brunswick, NJ: The Public Education Institute, Rutgers University.
- Natriello, G., A.M Pallas and E.L. McDill. 1986. "Taking stock: Renewing our research agenda on the causes and consequences of dropping out." Teacher's College Record. 87:430-40.
- Natriello, G., E.L. McDill and A.M. Pallas. 1987. In Our Lifetime: The Educationally Disadvantaged and the Future of Schooling and Society. Task Force Report submitted to the Committee for Economic Development, New York, NY (p.207). A revised version of this document has been accepted for publication by Teachers College Press, Columbia University, and will appear in 1989.
- Natriello, G., A.M. Pallas and K.L. Alexander. In Press. "On the right track?: The impact of school curriculum on cognitive growth." Sociology of Education.
- Pallas, A.M., D.R. Entwisle, K.L. Alexander and D. Cadigan. 1987. "Children who do exceptionally well in first grade." Sociology of Education 60: 257-271.
- Pallas, A.M., G. Natriello, and E.L. McDill. 1987. "The high costs of high standards: School reform and dropouts." Urban Education 22: 103-114.

- Rosenshine, B.V. and R.J. Stevens. 1986. "Teaching functions." In M.C. Wittrock (ed.), Third Handbook of Research on Teaching. New York: Macmillan.
- Slavin, R.E. 1985. "Cooperative learning: Applying contact theory in desegregated schools." Journal of Social Issues 41: 45-62.
- Slavin, R.E. 1985. "Team assisted individualization: A cooperative learning solution for adaptive instruction in mathematics." In M. Wang and H. Walberg (eds.), Adapting Instruction to Individual Differences. Berkeley, CA: McCutchan.
- Slavin, R.E. 1985. "Team assisted individualization." In R.E. Slavin, S. Sharan, S. Kagan, R. Hertz-Lazarowitz, C. Webb, and R. Schmuck (eds.), Learning to Cooperate, Cooperating to Learn. New York: Plenum. Reprinted in Barber, L. (1986), Adapting Instruction to Individual Needs: An Eclectic Approach. Bloomington, IN: Phi Delta Kappa.
- Slavin, R.E. and N. Karweit. 1985. "Effects of whole class, ability grouped, and individualized instruction on mathematics achievement." American Educational Research Journal 22: 351-367.
- Slavin, R.E. 1985. "An introduction to cooperative learning research." In R.E. Slavin, S. Sharan, S. Kagan, R. Hertz-Lazarowitz, C. Webb and R. Schmuck (eds.), Learning to Cooperate, Cooperating to Learn. New York: Plenum.
- Slavin, R.E. 1986. "Cooperative learning: Engineering social psychology in the classroom." In R. Feldman (ed.), The Social Psychology of Education: Current Research and Theory. Cambridge: Cambridge University Press.
- Slavin, R.E. 1986. "The Napa evaluation of Madeline Hunter's ITIP: Lessons learned." Elementary School Journal 87: 165-171.
- Slavin, R.E. 1986. "Best-evidence synthesis: An alternative to meta-analytic and traditional reviews." Educational Researcher 15 (9): 5-11. Winner of the Palmer O. Johnson Award (best article in an AERA journal in 1986), American Educational Research Association, 1988. Reprinted in W.R. Shadish and C.S. Reichardt (eds.), Evaluation Studies Review Annual (Vol. 12). Newbury Park, CA: Sage.
- Slavin, R.E. and N.A. Madden. 1986. "The integration of students with mild academic handicaps in regular classrooms." Prospects (Unesco) 16: 443-461.

- Slavin, R.E. 1986. "Learning together." American Educator 10 (2): 6-13.
- Slavin, R.E. 1986. "Small-group instruction." In T. Husen and T.N. Postlewaite (eds.), International Encyclopedia of Education. Oxford: Pergamon. Updated version published in International Encyclopedia of Teaching and Teacher Education. Oxford: Pergamon.
- Slavin, R.E., M.B. Leavey, and N.A. Madden. 1986. Team Accelerated Instruction - Mathematics. Watertown, MA: Mastery Education.
- Slavin, R.E. and N.A. Madden. 1986. "Count me in: Academic and school effects of integration of students with mild academic handicaps in regular classes." Prospects (Unesco), 16: 443-461.
- Slavin, R.E. 1987. "Cooperative learning: Can students help students learn?" Instructor (March): 74-78.
- Slavin, R.E. 1987. "The Hunterization of America's schools." Instructor (April): 56-58.
- Slavin, R.E. 1987. "Best-evidence synthesis: Why less is more." Educational Researcher 4: 15-16.
- Slavin, R.E. 1987. "Ability grouping and its alternatives: Must we track?" American Educator 11 (2): 32-36, 47-48.
- Slavin, R.E. 1987. "Developmental and motivational perspectives on cooperative learning: A reconciliation." Child Development 58: 1161-1167. Article also published in Italian translation as Apprendimento cooperativo, una proposta di conciliazione fra prospettive evolutive e motivazionali. Eta' Evolutiva 24: 54-61.
- Slavin, R.E. 1987. "Ability grouping and student achievement in elementary schools: A best-evidence synthesis." Review of Educational Research 57: 293-336.
- Slavin, R.E. 1987. "A theory of school and classroom organization." Educational Psychologist 22: 89-108.
- Slavin, R.E. 1987. "Cooperative learning: Where behavioral and humanistic approaches to classroom motivation meet." Elementary School Journal 88: 29-37.
- Slavin, R.E. 1987. "Combining cooperative learning and individualized instruction." Arithmetic Teacher 35 (3): 14-16.

- Slavin, R.E. 1987. "Taking the mystery out of mastery: A response to Guskey, Anderson, and Burns." Review of Educational Research 57: 231-235.
- Slavin, R.E. 1987. "Cooperative learning and the cooperative school." Educational Leadership 45 (3): P 7-13.
- Slavin, R.E. 1987. "Mastery learning reconsidered." Review of Educational Research 57: 175-213.
- Slavin, R.E. 1987. "Ability grouping in elementary schools: Do we really know nothing until we know everything?" Review of Educational Research 57: 347-350.
- Slavin, R.E. 1987. "Grouping for instruction: Equity and effectiveness." Equity and Excellence 23: 31-36.
- Slavin, R.E. 1987. "Making Chapter 1 make a difference." Phi Delta Kappan 69: 110-119. Winner of the Distinguished Achievement Award for Excellence in Educational Journalism, Educational Press Association of America (1988).
- Slavin, R.E. 1987. "Cooperative learning in geometry: 180 degrees off." Contemporary Psychology 32: 62-63.
- Slavin, R.E. 1987. "Cooperative learning and the education of black students." In D. Strickland and E. Cooper (eds.), Educating Black Children: America's Challenge. Washington, DC: Howard University Press.
- Slavin, R.E. 1987. "Grouping for instruction in the elementary school." Educational Psychologist 22: 109-127.
- Slavin, R.E. 1988. Educational Psychology: Theory into Practice. Englewood Cliffs, NJ: Prentice-Hall. (Second edition).
- Slavin, R.E., R.J. Stevens, and N.A. Madden. 1988. "Accommodating student diversity in reading and writing instruction: A cooperative learning approach." Remedial and Special Education 9: 60-66.
- Slavin, R.E. 1988. "Cooperative revolution catches fire." The School Administrator 45: 9-13.
- Slavin, R.E. In Press. "A cooperative learning approach to reading in content areas: Jigsaw II." In J. Flood and D. Lapp (eds.), Instructional Theory and Practice for Content Area Reading and Learning. Englewood Cliffs, NJ: Prentice-Hall.

- Slavin, R.E. In Press. "Student team learning in mathematics." In N. Davidson (ed.), Small Group Cooperative Learning in Mathematics. Boston: Addison Wesley.
- Slavin, R.E. In Press. "Grouping in elementary and secondary schools: A research synthesis." Educational Leadership.
- Slavin, R.E. In Press. "Student team learning." In S. Sharan (ed.), Handbook of Cooperative Learning.
- Slavin, R.E. In Press. "Class size and student achievement: Small effects of small classes." Educational Psychologist.
- Slavin, R.E. In Press. "Achievement effects of substantial reductions in class size." In R.E. Slavin (ed.), School and Classroom Organization. Hillsdale, NJ: Erlbaum.
- Slavin, R.E., N.L. Karweit, and N.A. Madden (eds.). In Press. Effective Programs for Students at Risk. Needham Heights, MA: Allyn and Bacon.
- Slavin, R.E., N.A. Madden, N.L. Karweit. In Press. "Effective programs for students at risk: Conclusions for practice and policy." In R.E. Slavin, N.L. Karweit, and N.A. Madden (eds.), Effective Programs for Students at Risk. Needham Heights, MA: Allyn and Bacon.
- Slavin, R.E. and N.A. Madden. In Press. "Effective classroom programs for students at risk." In R.E. Slavin, N.L. Karweit, and N.A. Madden (eds.), Effective Programs for Students at Risk. Needham Heights, MA: Allyn and Bacon.
- Slavin, R.E. In Press. "Comprehensive cooperative learning models for heterogeneous classrooms." The Pointer.
- Slavin, R.E. In Press. "Winning isn't everything, but is it anything?" Contemporary Psychology.
- Slavin, R.E. In Press. "A theory of school and classroom instruction." In R.E. Slavin (ed.), School and Classroom Organization. Hillsdale, NJ: Erlbaum.
- Slavin, R.E. In Press. "Grouping for instruction in the elementary school." In R.E. Slavin (ed.), School and Classroom Organization. Hillsdale, NJ: Erlbaum.
- Slavin, R.E. In Press. "Achievement effects of group-based mastery learning." In R.E. Slavin (ed.), School and Classroom Organization. Hillsdale, NJ: Erlbaum.

- Slavin, R.E. In Press. "Cooperative learning and school achievement." Educational Leadership.
- Slavin, R.E. In Press. "Cooperative learning and achievement: Six theoretical perspectives." In C. Ames and M.L. Maehr (eds.), Advances in Motivation and Achievement. Greenwich, CT: JAI Press.
- Slavin, R.E. In Press. "Cooperative learning and student achievement." In R.E. Slavin (ed.), School and Classroom Organization. Hillsdale, NJ: Erlbaum.
- Slavin, R.E. In Press. "On research and school organization: A conversation with Bob Slavin." Educational Leadership.
- Stevens, R.J., N.A. Madden, R.E. Slavin, and A.M. Farnish. 1987. "Cooperative integrated reading and composition: Two field experiments." Reading Research Quarterly 22 (4): 433-454.
- Stevens, R.J. 1988. "The effects of strategy training on the identification of the main idea of expository passages." Journal of Educational Psychology 80 (1988).
- Thomas, G.E. and J.H. Braddock, II. 1987. "Determining the college destination of black students." In A.S. Pruitt (ed.), In Pursuit of Equality of Higher Education. New York: General Hall.
- Thompson, M.S., K.L. Alexander and D.R. Entwisle. In Press. "Household composition, parental expectations and school achievement." Social Forces. In Press.
- Trent, W.T., J.H. Braddock, II and D. Henderson. 1985. "Sociology of education: A focus on education as an institution." Review of Research in Education 12: 295-336.
- Trent, W. T. J. H. Braddock, II. 1987. "Trends in black enrollment and degree attainment." In J. Williams (ed.), Title VI Regulation of Higher Education: Problems and Progress. New York: Teachers College Press.

Center Publications

- Alexander, K.L., D.R. Entwisle, D. Cadigan, & A.M. Pallas. 1987. Getting ready for first grade: Standards of deportment in home and school. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #8.
- Alexander, K.L., D.R. Entwisle, & M.S. Thompson. 1987. School performance, status relations, and structure of sentiment:

Bringing the teacher back in. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #9.

Becker, H.J. 1987. Addressing the needs of different groups of early adolescents: Effects of varying school and classroom organizational practices on students from different social backgrounds and abilities. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #16.

Becker, H.J. 1987. The impact of computer use on children's learning: What research has shown and what it has not. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #18.

Braddock, J.H., II, S. Wu, and J.M. McPartland. 1988. School organization in the middle grades: National variations and effects. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #24.

Entwisle, D.R., K.L. Alexander, A.M. Pallas, and D. Cadigan. 1988. A social psychological model of the schooling process over first grade. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #28.

Epstein, J.L. 1986. Toward an integrated theory of school and family connections. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #3.

Epstein, J.L. 1987. Target: An examination of parallel school and family structures that promote student motivation and achievement. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #7.

Epstein, J.L. 1988. Homework practices, achievements, and behaviors of elementary school students. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #26.

Epstein, J.L. and L. Pinkow. 1988. A model for research on homework based on U.S. and international studies. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #27.

Gottfredson, G.D. 1988. American education -- American Delinquency. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #23.

Gottfredson, G.D. 1988. You get what you measure, you get what you don't: Higher standards, higher test scores, more retention in grade. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #29.

- Gottfredson, G.D. and D.C. Gottfredson. 1987. Using organization development to improve school climate. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #17.
- Gottfredson, G.D. and L.G. Hybl. 1987. An analytical description of the school principal's job. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #13.
- Karweit, N.L. 1987. Full or half day kindergarten: Does it matter? Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #11.
- Karweit, N.L. 1987. Effective kindergarten programs and practices for students at risk. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #21.
- Karweit, N.L. 1987. Effective preschool programs for students at risk. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #22.
- Madden, N.A. and R.E. Slavin. 1987. Effective pull-out programs for students at risk. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #20.
- Madden, N.A., R.J. Stevens, & R.E. Slavin. 1986. A comprehensive cooperative learning approach to elementary reading and writing: Effects on student achievement. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #2.
- Madden, N.A., R.J. Stevens, & R.E. Slavin. 1986. Reading instruction in the mainstream: A cooperative learning approach. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #5.
- McPartland, J.M. 1987. Balancing high-quality subject-matter instruction with positive teacher-student relations in the middle grades. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #15.
- McPartland, J.M., J.R. Coldiron, & J.H. Braddock, II. 1987. A description of school structures and classroom practices in elementary, middle, and secondary schools. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #14.
- McPartland, J.M. and S. Wu. 1988. Instructional practices in the middle grades: National variations and effects. Johns

Hopkins University: Center for Research on Elementary and Middle Schools, Report #25.

Natriello, G. 1987. Evaluation processes in schools and classrooms. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #12.

Slavin, R.E. 1986. Ability grouping and student achievement in Elementary Schools: A Best Evidence Synthesis. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #1.

Slavin, R.E. 1987. Mastery learning reconsidered. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #7.

Slavin, R.E. and N.A. Madden. 1987. Effective classroom programs for student at risk. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #19.

Stevens, R.J. 1986. The effects of strategy training on the identification of the main idea of expository passages. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #4.

Stevens, R.J. N.A. Madden, R.E. Slavin, & A.M. Farnish. 1987. Cooperative integrated reading and composition: Two field experiments. Johns Hopkins University: Center for Research on Elementary and Middle Schools, Report #10.

Publications may be obtained by writing to:

Johns Hopkins University
3505 North Charles Street
Baltimore, Maryland 21218

CENTER FOR RESEARCH ON EVALUATION, STANDARDS, AND STUDENT TESTING

Regents of the University of California
Center for the Study of Evaluation
University of California at Los Angeles
Los Angeles, California 90024
(213) 825-4711

Co-Directors: Eva Baker (UCLA)
Graduate School of Education
145 Moore Hall, UCLA
Los Angeles, California 90024

Robert Linn (University of
Colorado)
School of Education
Campus Box 249
Boulder, Colorado 80309

Affiliated Institutions: University of Chicago; University
of Colorado; Educational Testing
Service; University of Illinois;
Arizona State University; University
of California at Santa Barbara; and
National Opinion Research Center

Mission

The Center's mission is to conduct research and development in
the areas of testing and evaluation to assess and improve its
impact on educational quality.

Programs of Research

Principal Investigator

Testing for the Improvement of
Learning Program (Testing)

Eva L. Baker
Robert Linn

Systems for Evaluating and Improving
Educational Quality Program
(Evaluation)

Eva L. Baker
Robert Linn

The Impact of Testing and Evalua-
tion on Educational Standards,
Policy, and Practice Program
(Impact)

Eva L. Baker
Robert Linn

School Reform Assessment

Eva L. Baker
Robert Linn

OERI Center Liaison: Ram Singh
Office of Research
Learning and Instruction Division
(202) 357-6032

Major Research Findings

- o The Texas Examination of Current Administrators and Teachers (TECAT) is a basic literacy test that was administered to more than 200,000 practicing educators in March 1986. An in-depth case study of this test indicated the following:
 - (1) Great statewide effort went into preparing teachers for the TECAT. The Texas Education Agency, universities, teacher organizations, districts, and regional education centers developed study guides and review materials and offered workshops. Educators spent an average of 12 hours preparing for the test.
 - (2) Standards were set for a failure rate of approximately 12%; however, on the first try, only 3.3 % failed. Initial passing rates for Hispanics and black teachers were 94% and 81.6%, respectively. Overall, special education teachers and staff from group homes, P.E. teachers and coaches, and vocational education teachers (who had never been required to have college degrees) were over-represented among the failures.
 - (3) Ninety percent of teachers reported that the TECAT had a demoralizing effect on them or their colleagues. Teachers felt degraded by having to study for such a low-level test. An atmosphere of stress and bitterness was created by the high-stakes of losing a job over failing the Test.
 - (4) Half of the teachers interviewed said that the TECAT accomplished its purpose of weeding out incompetent teachers and reassuring the public. The other half said that negative publicity and the high passing rate made the TECAT a joke. Before and after TECAT, public support for teacher competency testing declined more than for any other educational reform.
 - (5) The cost of the test was 10 times greater than expected and the failure rate was one-tenth of

that expected, resulting in a public cost per failed teacher of \$30,000.

- o A study of the effects of minimum competency testing for receiving a high school diploma revealed that high school students who initially fail such tests are significantly more likely to express doubts about their chances of completing the diploma.
- o A study of word decoding and recognition indicated that there is a significant relationship between word frequency and word difficulty for tests of speed and accuracy and word recognition. There is also some evidence that exposure to specific words in the basal reading series has an impact on test performance by the beginning of third grade.
- o The methods student use to solve problems depends more on the response required (quantitative vs. qualitative) than on how the problem is presented. Many students readily translated from word problems to formulas. Many curricula, especially in mathematics and science, are based on the notion that presenting information to students in multiple ways (pictures, words, manipulatives) will produce fuller understanding of the subject matter than presenting information in one or few representations. If students are required to give the same kind of response (e.g., numerical regardless of the way the problem is represented, the variety of representations may have only limited benefit. The potential may only be realized when the variety presentations of the given information is linked to a variety of kinds of responses required from students.
- o Case studies of five sites which attempted educational reform by raising standards on tests found that:
 - (1) When standards on tests are raised, safety nets are strung up (in the form of exemptions, repeated trials, softening cut-scores, etc.) to catch those who fail.
 - (2) In reality, issues of excellence and quality are not paramount in setting standards. Standards are determined by consideration of politically and economically acceptable pass rates, symbolic appearances, and scarcely at all by a behavioral analysis of necessary skills and competencies.
 - (3) At least in the five sites studied, reform by raising test score standards appeared to have

largely symbolic value and did little instrumentally to improve educational quality or accomplishment.

Selected Accomplishments

- o The second edition of The Evaluation Kit, produced by UCLA's Center for the Study of Evaluation (CSE), was released by SAGE during FY'87. The Kit contains nine books written to guide and assist practitioners in planning and managing various kinds of evaluations (e.g., how to design a program evaluation, how to use qualitative methods in evaluation, how to measure attitudes, how to analyze data). While production of the Kit was not directly supported by OERI, it contributes greatly to organizational visibility and, indirectly, to the perceived impact of OERI centers.
- o Throughout FY'87, CRESST produced three particularly successful conferences. "Making Schools Work for Underachieving Minorities: Next Steps in Research, Policy, and Practice" was co-directed by CRESST's Educational Professional in Residence (practitioner), Josie Bain, and a member of CRESST's professional staff, Pamela Aschbacher. The conference was held at UCLA on June 25 and 26, 1987 in cooperation with the National Urban League, The National Council of La Raza, and The Council of Great City Schools.

A second conference, "Approaches to Subject Matter Assessment" met on December 10 and 11, 1987 at UCLA. This conference was held as the first step in a plan adopted by OERI's Centers to undertake a series of substantive, thematically focused meetings on their research. Over 40 participants, representing nine centers, four labs, state agencies, the National Science Foundation, and test publishers presented papers and discussed the progress of work on the issue of assessing subject matter expertise.

Additionally, CRESST held a two-day meeting in May, 1987 to (a) discuss technical concerns surrounding state-level RFPs and (b) draft model RFPs. Participants included six state testing directors experienced in the RFP process, five commercial test companies who bid on such RFPs, and six researchers from the academic measurement community. As a result, guidelines for improving the RFP process were developed and are ready for distribution in loose leaf format so that sections may be modified according to the needs of various audiences.

- o One of CRESST's on-going projects, "Toward a National Testing Network," has important implications for the design of multi-user, multi-level evaluation systems

that are both (a) responsive to individual differences at the individual, class, and school levels and (b) able to provide policymakers at the local, state, and national levels with the comparative information they require for decisionmaking. During 1987, effort was devoted to two phases in the development of a duplex design for 8th-grade mathematics. The first involved analyzing and reporting data from the field trial design carried out in 32 Illinois schools. Reports to individual students and classroom teachers were delivered in May, 1987; school and state level reports to principals, teachers and the Illinois State Board of Education were delivered over the summer. The second phase is a similar trial in California based on an improved version of the 24-booklet duplex instrument; this phase was initiated in September, 1987.

- o Research at the Center for the Study of Evaluation was the basis for the design of the IEA Writing Study (18 country, international comparison).
- o Bob Linn's research in reading assessment (in collaboration with the Center for the Study of Reading) is being used in the design of the new Illinois reading assessment.
- o CRESST's Quality Indicators Study Group is contributing directly to the NAEP redesign study.
- o CRESST's faculty and staff have been active participants on the agendas of a wide variety of policymaker and practitioner groups such as NEA, Council of Great City Schools, Council of Chief State School Officers, Educational Commission of the States, state legislators, etc.

Publications

Books and Articles

Baker, E. & Aschbacher, P. (eds.) In press. Improving Large Scale Assessment. Los Angeles, CA.: Center for Research on Evaluation and Standards.

Baker, E.. In press. "Mandated tests: Educational reform or quality indicator?" In . Gifford (ed) Testing and the Allocation of Opportunity. Boston: Kluwer Nyhoff.

Baker, E. & O'Neil, H. "Issues in intelligent computer-assisted instruction: Evaluation and measurement." In Conoley, J.C. (ed.) The computer as adjunct to the decision making process. Hillsdale, N.J.: Lea/Wiley (in press).

- Baker, E. "Can we fairly measure the quality of education?" NEA Today: Issues '88, 6(6) 1988.
- Bain, J. & Herman, J. (eds.) In press. Making Schools Work for Underachieving Minority Students. Stanford, Conn.: Greenwood Press.
- Burstein, L. (1988) Educational Quality Indicators in the United States. Studies in Educational Evaluation.
- Bock, R. D. Comprehensive Educational Assessment for the States: The Duplex Design. Evaluation Comment. November, 1987.
- Bock, R. D. (Ed) Multilevel Analysis of Educational Data. Cambridge, Mass: Academic Press (in press).
- Catterall, J. Dropping out of school as a process: Implications for research, policy and practice. The Urban Educator. 1988.
- Catterall, J. On the social costs of dropping out of school. The High School Journal, 71(1) 1988.
- Ellwein, M. C., Glass G., & Smith M. L. Standards of Competence: Propositions on the nature of testing reforms. Educational Research, November, 1988, 17(8).
- Glass, G. and Ellwein, M. C. Reform by Raising Test Standards. Evaluation Comment. December, 1986.
- Grissom, J. and Shepard, L. Repeating and Dropping Out of School. In L. Shepard and M. L. Smith (eds.) Flunking Grades: Research and Policies on Retention. New York: Falmer Press, 1988.
- Linn, R. Dimensions of Thinking: Implications for Testing. In B. Jones and L. Idol (eds.) Dimensions of Thinking and Cognitive Instruction. (in press.)
- Linn, R. The Definition of Content for Testing. Educational Researcher. 1988.
- Muthen, B. Using Item Specific Instructional Information in Achievement Modeling. Psychometrika. 1988.
- Shepard, L. and Kreitzer, A. The Texas Teacher Test. Educational Researcher. August, 1987.

Center Publications

Technical Reports

- Quality, content, and context in the assessment of student learning and development in college. 1986. C. Robert Pace (Technical Report No. 256).
- Information use in secondary schools: A case study of the development of a comprehensive information system. 1986. Donald Dorr-Bremme (Technical Report No. 257).
- Social vs. clinical perspectives on the use of information: Implications for school-based information systems. 1986. Kenneth A. Sirotnik, Donald Dorr-Bremme, and Leigh Burstein (Technical Report No. 258).
- Using state test data for national indicators of education quality: A feasibility study. 1986. Leigh Burstein, Eva L. Baker, Pamela Aschbacher, and J. Ward Keesling (Technical Report No. 259).
- Specificity of information in data-based decision making in schools. 1986. Leigh Burstein (Technical Report No. 260).
- Measurement and statistical issues in multilevel research on schooling. 1986. Kenneth A. Sirotnik and Leigh Burstein (Technical Report No. 261).
- Comprehensive educational assessment for the states: The duplex design. 1986. R. Darrell Bock and Robert Mislevy (Technical Report No. 262).
- Standards of competence: A multi-site case study of school reform. 1986. Mary C. Ellwein and Gene V. Glass (Technical Report No. 263).
- A process model of dropping out of school: Implications for research and policy in an era of raised academic standards. 1986. James S. Catterall (Technical Report No. 264).
- Educational quality indicators in the United States: Latest developments. 1986. Leigh Burstein (Technical Report No. 265).
- Reading assessment: Practice and theoretical perspectives. 1986. Robert L. Linn and Sheila W. Valencia (Technical Report No. 266).

Speed and accuracy of word decoding and recognition. 1987. Robert L. Linn, Sheila W. Valencia and Katherine E. Ryan (Technical Report No. 267).

Some uses of structural equation modeling in validity studies: Extending IRT to external variables using SIMS results. 1986. Bengt Muthen (Technical Report No. 268).

The role of symbol systems in problem solving: A literature review. 1986. Richard J. Shavelson, Noreen M. Webb, Michal Shemesh, & Jin-Wen Yang (Technical Report No. 269).

Translation among symbolic representation in problem solving: Results of preliminary study. 1987. Richard J. Shavelson, Noreen M. Webb, Michal Shemesh, and Jin-Wen Yang (Technical Report No. 270).

Using item specific instructional information in achievement modeling. 1987. Bengt Muthen (Technical Report No. 271).

Issues in intelligent computer-assisted instruction: Evaluation and measurement. 1987. Harry F. O'Neill and Eva L. Baker (Technical Report No. 272).

Definition of content in social studies testing: Conceptual content assessment report. 1987. Ernest R. House, Carol Emmer, Elaine Kolitch, Barbara Waitz, and Eva L. Baker (Technical Report No. 273).

Evaluation for school improvement: Try-out of a comprehensive school-based model. 1987. Joan L. Herman (Technical Report No. 274).

State-by-State comparison of student achievement: The definition of the content domain for assessment. 1987. Robert L. Linn (Technical Report No. 275).

A case study of the Texas teacher test: Technical report. 1987. Lorrie A. Shepard, Amelia E. Kreitzer and M. Elizabeth Graue (Technical Report No. 276).

The Texas teacher. 1987. Lorrie A. Shepard and Amelia E. Kreitzer (Technical Report No. 277).

Standards and School Dropouts: A National Study of the Minimum Competency Test. 1987. James S. Catterall (Technical Report No. 278).

Designating winners: Using evaluation in school recognition programs. 1988. Edward Wynne (Editor) (Technical Report No. 279).

Conversations on evaluation utilization. 1988. Marvin Alkin
(Editor) (Technical Report No. 280).

Multiple choice questions as a diagnostic tool. 1988. Pinchas
Tamir (Technical Report No. 281).

Dimensions of thinking: Implications for testing. 1988. Robert L.
Linn (Technical Report No. 282).

Survey on ECIA Chapter I evaluation regulations. 1989. Sharon
Johnson-Lewis (Editor) (Technical Report No. 283).

Publications may be obtained by writing to:

Regents of the University of California
Center for the Study of Evaluation
University of California at Los Angeles
Los Angeles, California 90024

CENTER FOR THE STUDY OF LEARNING

Learning, Research and Development Center (LRDC)
University of Pittsburgh
3939 O'Hara Street
Pittsburgh, Pennsylvania 15260
(412) 624-7485

Director: Robert Glaser, LRDC; Lauren Resnick, LRDC

Associate Director: James Voss, Center for the Study of Learning

Mission

The Center seeks to create new knowledge that will be useful in teaching students how to become competent thinkers, learners, and problem solvers. The Center's research focuses on understanding the skills underlying successful thinking and learning in three areas of the school curriculum: mathematics, science, and social studies. The research is directed at children of all ability levels, from the hardest to teach to the most talented.

Programs of Research

Principal Investigators

Mathematics Learning

Gaea Leinhardt
Stellan Ohlsson
Lauren Resnick
Edward Silver

Science Learning

Micheline Chi
Robert Glaser

Social Studies Learning

Isabel Beck
John Levine
James Voss

Learning Skills

Charles Perfetti

OERI Center Liaison: Judith Segal
Office of Research
Learning and Instruction Division
(202) 357-6021

Major Research Findings

o About Learning to Read...

Vocabulary instruction that promotes understanding of relationships between words and discussion of word

meanings and uses can improve reading comprehension skill. In contrast, narrow vocabulary instruction which focuses only on definitions does not improve comprehension.

- o Revisions to texts that make them more coherent, i.e., make relationships explicit and provide background knowledge, yield better comprehension for young students. Successful revisions were, in fact, easier for students to read even though traditional readability measures would have judged these passages were now more difficult. Thus, the revisions also demonstrated the inadequacies of these traditional readability formulas.
- o Young students' comprehension can be improved if reading lessons give greater attention to establishing background information and present questions that encourage students to reconstruct the story line.

In learning new material from texts there is an interaction between general comprehension skills and specific knowledge learners bring with them of the subject matter. While the significant role of prior knowledge in the acquisition of new understandings is clear, readers can use general linguistic skills to understand texts for which they lack knowledge.

Elementary students and college students share some of the same reading skills and deficits. College students who have reading comprehension difficulties display also basic work processing problems, just as do very young students. Most readers who have comprehension problems also have word identification and linguistic memory weaknesses.

Learning to read increases a first grade student's sensitivity to the structure of spoken language, particularly the phonological structure.

Early (beginning of first grade) difficulty in quickly reading words aloud strongly predicts reading comprehension difficulty in third and fourth grades regardless of whether children are taught mainly by a "decoding" or a "whole word" method. But early comprehension difficulties do not predict later word reading difficulties. The finding confirms the importance of automatic word recognition in developing reading comprehension.

- o About Mathematics Learning...

Successful elementary mathematics explanations include links between old and new concepts, demonstration with multiple representations of a concept, and proof of

legitimacy for each move. To construct such explanations, teachers require a rich knowledge of the topic and how it is learned.

The reason children have a hard time learning certain mathematical concepts (e.g., fractions) is that these concepts can be interpreted in several different ways, and standard school instruction mixes those interpretations. The result is an inconsistent message to the children.

Children regularly invent arithmetic computation procedures that are "buggy"--systematically incorrect. These buggy procedures are variants of school-taught computational rules. Their prevalence highlights the fact that instructional practice leads children to distrust their mathematical intuition and to rely excessively on formal rules.

All children, on the basis of their everyday experience, develop correct and powerful intuitions about the additive properties of numbers. Multiplicative and ratio concepts are not so easily developed in everyday experience.

It is possible to develop deep understanding of computational procedures in children by linking the procedures carefully to everyday intuitions. However, understanding a procedure does not automatically eliminate errors that had been practiced earlier.

o About Social Studies Learning...

Major social studies texts lack clear content goals, assume more sophisticated knowledge than is realistic for young learners, and fail to provide explanations adequate for students to coherently understand historical and geographical concepts.

The quality of people's reasoning about social science issues is directly related to the amount of knowledge they have about the particular issue at hand.

The direct teaching of reasoning that includes argumentation is an important tool for building understanding of social science concepts. In addition, teachers need to examine textbooks judiciously and supplement them, when necessary, with opportunities to explore a broad range of supportive reasons, causal statements and counter arguments in arriving at conclusions.

- o About Science Learning...

Students are most successful at learning to solve physics problems if they engage in self-explanations (e.g., explaining the steps of an example-solution to themselves). It may be possible to teach students skills for self-explanation and thereby increase their ability to learn even from less than ideal textbooks.

Studies with intelligent tutor computer-based science laboratories have found several differences between effective and less effective students' scientific discovery abilities. These include individual differences in appropriate generalizing, goal setting, and planning; the structure of problem-solving search; specific discovery strategies; and memory and data management skills.

- o About Learning and Higher Order Thinking Skills...

Many of the ability differences usually attributed to children's age and developmental stage (such as memory span,...) are in fact the result of having more and better organized knowledge. Developmental stage therefore places fewer restrictions on instruction than had been thought.

Programs successful in teaching higher order thinking abilities involve substantial social interaction and collaborative problem solving by students.

Higher order thinking cannot be effectively assessed by multiple-choice or other precoded forms of testing. It requires instruction that engages students in relatively complex problem solving over extended periods of time.

Expert performances in various domains have consistent characteristics such as integrated, coherent knowledge, recognition of patterns in problem solving, automated basic skills that free attention for higher level processing and abilities for self-monitoring of performance. These can guide the design of instruction and allow students and teachers to monitor students' progress.

- o About Schooling...

One cannot adequately assess the impact of desegregated schools on race relations just by examining changes in students' social attitudes. Attitudes can appear to change in a positive direction, while behaviors remain negative. This means that studies seeking to determine

effective strategies for integration must assess changes deeply, looking beyond simple attitude change measures.

An effect of using computers for instruction is a change in an important aspect of classroom structure and functioning. For example, in some classrooms grading practices and the proportion of time the teacher spends with students of different ability levels undergo change.

Elementary school children show a high degree of "rationality" in selecting co-workers. They accurately perceive the interpersonal rewards in different work situations and use information about others' performance to select "maximally-useful" co-workers for each situation (e.g., high-performance partners for cooperation and low-performance opponents for competition).

Research has shown that learning disabled and other previously segregated students can be "mainstreamed" under conditions where instruction is individualized for all students and students learn to manage their time in a self-scheduling" program.

School improvement programs can be made more effective if, as they proceed, they are continuously monitored so that mid-course corrections can be made. This is a form of evaluation activity, one that stresses a "client orientation" and the delivery of useful data for decision making in a timely fashion.

Selected Accomplishments

- o Four sets of computer programs to assist development of reading skill were developed based on research done at LRDC and elsewhere. These programs, three for decoding and one for vocabulary/comprehension, are now available to schools from a commercial publisher and more than 2000 units have been sold.
- o Samples of vocabulary instruction, used in our research to improve comprehension, were requested by and sent to over 1,000 educators.
- o The concept of a story map, a coherent method to develop questions for reading selections, has now been incorporated in a number of commercial basal reading programs.
- o An institutional collaboration with the American Federation of Teachers (AFT) has been established. In this project work is proceeding on codifying recent findings

about the teaching and learning of mathematics and translating these into materials appropriate for dissemination to classroom teachers. The joint CSL-AFT project is also developing and disseminating new models of researcher-teacher collaboration.

- o In a second major collaboration, CSL researchers are working with the Association for Supervision and Curriculum Development (ASCD). Initially, four articles based on research findings appeared in the ASCD periodical for its members. A second undertaking has been the commitment of LRDC researchers to produce a Yearbook publication (in effect the Association's featured monograph) for 1989. The goal of the Yearbook is to summarize in a number of key areas what is being learned by cognitive science and related disciplines about learning and instruction in subject matter learning.
- o An approach to conducting decision-oriented educational research has been developed which has proven effective at the school district level and is now being tested in state and federal levels. The approach seeks to generate data that are useful to school practitioners as they monitor and shape school improvement programs.
- o Research on expert teacher has led to the development of assessment exercises for both the state of Connecticut and proposed National Board examination for the Carnegie Forum for Education and the Economy.
- o Computer systems have been built that enable children to interact with dynamic models of key elementary mathematical concepts. These systems can also be used as "intelligent blackboards" for teacher led discussions.
- o A microexperimental laboratory has been developed--a software system for developing experiments that is in use at 200 universities worldwide.
- o A monograph, written for the National Academy Press "Education and Learning to Think" has been distributed to states and school districts nationwide, as well as professional educational associations.
- o Three computer laboratories have been developed to instruct students about both science topics and effective processes of scientific discovery. The laboratories are also used to study individual differences in scientific reasoning and have led to development of an intelligent tutoring authoring system that supports the efficient design of computer laboratories in new science topics.

- o The "Self-Schedulint" system, developed at the Center and used with varied forms of individualized instructional materials, is being implemented in hundreds of classrooms, nation-wide, and especially for "Mainstreaming" exceptional children.

Publications

Books and Articles

- Ackerman, P.L., Ackerman, Sternberg, R.J. and Glaser, R. 1987. "Learning and Individual Differences." San Francisco: Freeman.
- Beck, Isabel L. 1986. "Using Research on Reading." Educational Leadership 43:13-15.
- Beck, I.L. and McKeown, M.G. (in press) "Conditions of Vocabulary Acquisition." In The Handbook of Reading Research Vol. 2, edited by P. D. Pearson. New York: Longman.
- Beck, I.L. and McKeown, M.G. 1988. "Toward Meaningful Accounts in History Texts for Young Learners." Educational Researcher 17:31-39.
- Beck, I.L. and McKeown, M.G. 1987. "Getting the Most from Basal Reading Selections." Elementary School Journal (Special issue on the basal reader) 87:343-356.
- Champagne, Audrey B., Gunstone, R. F., and Klopfer, L. E. 1985. "Effecting Changes in Cognitive Structures Among Physics Students." Pp. 163-188 in Cognitive Structure and Conceptual Change, edited by L. H. T. West and A. L. Pines. New York: Academic Press.
- Chi, Michelene T. H., Glaser, R., and Farr, M. 1988. "The Nature of Expertise." Hillsdale, N.J.: Erlbaum.
- Chi, Michelene T.H. 1988. "Children's Lack of Access and Knowledge Reorganization: An Example from the Concept of Animism." Pp. 169-194 in Memory Development: Universal Changes and Individual Differences, edited by F. Weinert and M. Perlmutter. Hillsdale, NJ: Erlbaum.
- Chi, Michelene T.H. 1985. "Changing Conception of Sources of Memory Development." Human Development 28:50-56.
- Chi, M. T. H., Bassok, M., Lewis, M. W., Reimann, P., and Glaser, R. (in press) "Self explanations: How students study and use examples in learning to solve problems." Cognitive Science.

- Chi, M.T.H., and Ceci, S.J. 1987. "Content Knowledge: Its Representation and Restructuring in Memory Development." Pp. 91-142 in Advances in Child Development and Behavior Vol. 20, edited by H.W. Reese and P. Lipsitt. New York: Academic Press.
- Chi, M.T.H., and Glaser, R. 1985. "Problem Solving Ability." Pp. 227-257 in Human Abilities: An Information-Processing Approach, edited by R. Sternberg. San Francisco: Freeman.
- Chi, M.T.H., and Greeno, J. G. 1987. "Cognitive Research Relevant to Education." Psychology and Education Policy 517:39-57.
- Chi, M.T.H., Hutchinson, J., and Robin, A. (in press) "How Inferences about Novel Domain-Related Concepts Can Be Constrained by Structured Knowledge." To appear in a special issue of the Merrill-Palmer Quarterly.
- Chipman, S.F., Segal, J.W., and Glaser, R. 1985. "Thinking and Learning Skills: Research and Open Questions Vol. 2, Hillsdale, N.J.: Erlbaum.
- Cooley, William W. 1987. "Developing an Elementary School Information System: The Computer-Assisted Professional." Pp. 86-96 in Information Systems and School Improvement: Inventing the Future, edited by A. Bank and R. C. Williams. New York: Teachers College Press.
- Cooley, W.W. and Bickel, W.E. 1986. "Decision-Oriented Educational Research, Nowell, MA:Kluwer.
- Glaser, Robert. 1988. "Cognitive Science and Education." International Science Journal 40(1):21-44.
- Glaser, R. 1987. "Advances in Instructional Psychology" Vol. 3.
- Glaser, Robert. 1987. "The Integration of Instruction and Testing: Implications from the Study of Human Cognition." Pp. 329-341 in Talks to Teachers, edited by D. C. Berliner and B. V. Rosenshine. New York: Random House.
- Glaser, Robert. 1987. "Learning Theory and Theories of Knowledge." Pp. 397-414 in Learning and Instruction, edited by E. De Corte, H. Lodewijks, R. Parmentier, and P. Span. Oxford/Leuven: Pergamon Press/Leuven University Press.
- Glaser, Robert. 1987. "The Study of Cognition and Instructional Design: Mutual Nurturance." Behavioral and Brain Sciences 10:483-484.
- Glaser, Robert. 1986. "Intelligence as acquired proficiency." Pp. 77-83 in What is Intelligence? Contemporary Viewpoints on

Its Nature and Definition, edited by R. J. Sternberg and D. K. Detterman. Norwood, NJ: Ablex.

Glaser, Robert. 1986. "On the Nature of Expertise." Pp. 915-928 in Human Memory and Cognitive Capabilities, edited by F. Klix and H. Hagendorf. North Holland: Elsevier.

Glaser, Robert. 1985. "Foreward." Pp. v-viii in In becoming a nation of readers: The report of the Commission on Reading. Pittsburgh, PA: National Academy of Education.

Glaser, R. and Bassok, M. (in press) "Learning Theory and the Study of Instruction." Annual Review of Psychology. Palo Alto, CA: Annual Reviews, Inc.

Glaser, R., Lesgold, A. M., and Lajoie, S. 1987. "Toward a Cognitive Theory for the Measurement of Achievement." Pp. 41-85 in The Influence of Cognitive Psychology on Testing and Measurement, edited by R. R. Ronning, J. Glover, J. C. Conoley, and J. C. Witt. Hillsdale, NJ: Erlbaum.

Glaser, R., and Pellegrino, J. W. 1987. "Aptitudes for Learning and Cognitive Processes." Pp. 267-288 in Metacognition, Motivation and Understanding, edited by F. Weinert and R. Kluwe. Hillsdale, NJ: Erlbaum.

Glaser, R. and Takanishi, R., editors. 1986. "Psychological Sciences and Education." American Psychologist 41.

Kerr, M.M., Zigmond, N., Schaeffer, A.L. and Brown, G.M. 1986. "An Observational Follow-up Study of Successful and Unsuccessful High School Students." The University of North Carolina Press.

Klopfer, Leopold E. 1986. "The Coming Generation of Tutoring Software." The Science Teacher 56(8):34-37.

Klopfer, Leopold E. (in press). "Intended Learning Outcomes: Scientific Enquiry." In The Science Curriculum and the Student Laboratory, edited by E. H. Hegarty. London: Croom Helm.

Leinhardt, Gaea. (in press) "Math Lessons: A Contrast of Novice and Expert Competence." Journal for Research in Mathematics Education.

Leinhardt, Gaea. 1988a. "Expertise in Instructional Lessons: An Example from Fractions." Pp. 47-66 in Perspectives on Research on Effective Mathematics Teaching Vol. 1, edited by D.A. Grouws and R.J. Cooney. Hillsdale, NJ: Erlbaum.

- Leinhardt, Gaea. 1988b. "Getting to Know: Tracing Students' Mathematical Knowledge from Intuition to Competence." Educational Psychologist 23:119-144.
- Leinhardt, Gaea. 1988c. "Situated Knowledge and Expertise in Teaching." Pp. 146-168 in Teachers' Professional Learning, edited by J. Calderhead. London: Falmer Press.
- Leinhardt, Gaea. 1987. "The Development of an Expert Explanation: An Analysis of a Sequence of Subtraction Lessons." Cognition and Instruction 4:225-282.
- Leinhardt, G., and Bickel, William E. 1987. "Instruction's the Thing Wherein to Catch the Mind That Falls Behind." Educational Psychologist 22:177-207.
- Leinhardt, G., and Putnam, Ralph T. 1987. "The Skill of Learning from Classroom Lessons." American Educational Research Journal 24:557-587.
- Leinhardt, G., Weidman, C., and Hammond, K.M. 1987. "Introduction and Integration of Classroom Routines by Expert Teachers." Curriculum Inquiry 17:135-176.
- Leinhardt, G., and Greeno, J. G. 1986. "The Cognitive Skill of Teaching." Journal of Educational Psychology 78:75-95.
- Leinhardt, G., and Smith, D. 1985. "Overlap: Influencing What's Taught." Journal of Classroom Interaction 21:2-11.
- Lesgold, Alan M. (in press). "Reading is a Redundant Collection of Complex Skills." In Reading Research Into the 90's, edited by R. Spiro. Hillsdale, NJ: Erlbaum.
- Lesgold, A.M. and Glaser, R. 1989. "Foundations for a Psychology of Education." Hillsdale, N.J.:Erlbaum.
- Lesgold, Alan M. 1988a. "Problem Solving." Pp. 188-213 in The Psychology of Human Thought, edited by R. J. Sternberg and E. E. Smith. Cambridge: Cambridge University Press.
- Lesgold, Alan M. 1988b. "Toward a theory of curriculum for use in designing intelligent instructional systems." Pp. 114-137 in Learning Issues for Intelligent Tutoring Systems, edited by H. Mandl and A. Lesgold. New York: Springer-Verlag.
- Lesgold, Alan M. 1986. "Preparing Children for a Computer-Rich World." Educational Leadership 43(6):7-11.
- Lesgold, A. M., Lajoie, S., Bunzo, M., and Eggan, G. (in press). "SHERLOCK: A Coached Practice Environment for an Electronics

Troubleshooting Job." In Computer Assisted Instruction and Intelligent Tutoring Systems: Establishing Communication and Collaboration, edited by J. Larkin, R. Chabay, and C. Scheftic. Hillsdale, NJ: Erlbaum.

Lesgold, A. M., Resnick, L. B., and Hammond, K. 1985. "Learning to Read: A Longitudinal Study of Word Skill Development in Two Curricula." Pp. 107-138 in Reading Research: Advances in Theory and Practice Vol. 4, edited by G. E. MacKinnon and T. G. Waller. New York: Academic Press.

Levine, John M. (in press) "Reaction to Opinion Deviance in Small Groups." In Psychology of Group Influence (second edition), edited by P. Paulus. Hillsdale, NJ: Erlbaum.

Levine, J. M. and Moreland, Richard L. 1985. "Innovation and Socialization in Small Groups." Pp. 143-169 in Perspectives on Minority Influence, edited by S. Moscovici and E. Van Avermaet. Cambridge: Cambridge University Press.

Levine, J.M. and Russo, E.M. 1987. "Majority and Minority Influence." Pp. 13-54 in Review of Personality and Social Psychology Vol. 8. Newbury Park, CA: Sage.

McKeown and Curtis, M.E. 1987. "The Nature of Vocabulary Acquisition". Hillsdale, N.J.:Erlbaum.

Mandl and Lesgold, A. 1988. "Learning Issues for Intelligent Tutoring Systems." New York: Springer-Verlag.

Means, Mary L., and Voss, James F. 1985. "Star Wars: A Developmental Study of Expert and Novice Knowledge Structures." Journal of Memory and Language 24:746-757.

Miller, S.E., Leinhardt, G., and Zigmond, N. (in press) "Influencing Engagement through Accommodation: An Ethnographic Study of At-Risk Students." American Educational Research Journal.

Moreland, Richard L., and Levine, John M. (in press) "Newcomers and Oldtimers in Small Groups." In Psychology of Group Influence: New Perspectives, edited by P. Paulus. Hillsdale, NJ: Erlbaum.

Moreland, Richard L., and Levine, John M. 1988. "Group Dynamics Over Time: Development and Socialization in Small Groups." In The Social Psychology of Time: New Perspectives, edited by J.E. McGrath. Newbury Park, CA: Sage.

Nelson-Le Gall, Sharon. 1985. "Help-seeking behavior in learning." Pp. 55-90 in Review of Research in Education (Vol.

12), edited by E. W. Gordon. Washington, DC: American Educational Research Association.

Nelson-Le Gall, S., and DeCooke, P. A. 1987. "Same-Sex and Cross-Sex Help Exchanges in the Classroom." Journal of Educational Psychology 79(1):67-71.

Nelson-Le Gall, S., and Glor-Scheib, S. 1986. "Academic Help-Seeking and Peer Relations in School." Contemporary Educational Psychology 11:187-193.

Ohlsson, Stellan. (in press) "Trace Analysis and Spatial Reasoning: An Example of Cognitive Diagnosis and Its Implications for Testing." In Diagnostic Monitoring of Skill and Knowledge Acquisition, edited by N. Frederiksen. Norwood, NJ: Ablex.

Ohlsson, Stellan. 1988. "Mathematical Meaning and Applicational Meaning in the Semantics of Fractions and Related Concepts." Pp. 53-92 in Number Concepts and Operations in the Middle Grades Vol. 2, edited by J. Hiebert and M. Behr. Reston, VA: Erlbaum and National Council of Teachers of Mathematics.

Ohlsson, Stellan. 1987. "Sense and Reference in the Design of Interactive Illustrations for Rational Numbers." Pp. 307-344 in Artificial Intelligence and Education Vol. 1, edited by R. Lawler and M. Yazdani. Norwood, NJ: Ablex.

Ohlsson, Stellan. 1986. "Some Principles of Intelligent Tutoring." Instructional Science 14:293-326.

Perfetti, Charles A. 1988. "Verbal Efficiency in Reading Ability." Pp. 109-143 in Reading Research: Advances in Theory and Practice Vol. 6, edited by G.E. MacKinnon, T.G. Waller, and M. Daneman. New York: Academic Press.

Perfetti, C.A. 1985. "Reading Ability." New York: Oxford Press.

Perfetti, Charles A. 1987. "Language, Speech, and Print: Some Asymmetries in the Acquisition of Literacy." Pp. 353-367 in Comprehending Oral and Written Language, edited by P. Horowitz and S.J. Samuels. New York: Academic Press.

Perfetti, Charles A. 1986. "Cognitive and Linguistic Components of Reading Ability." Pp. 11-39 in Learning to Read: Cognitive Universals and Cultural Constraints, edited by B. Foorman and A. Siegel. Hillsdale, NJ: Erlbaum.

Perfetti, C.A. and Curtis, M.E. 1986. "Reading." Pp. 13-57 in Cognition and Instruction, edited by R. F. Dillon and R. J. Sternberg. New York: Academic Press.

- Rabinowitz, Mitchell, and Chi, M.T.H. 1986. "An Interactive Model of Strategic Processing." Pp. 83-102 in Handbook of the Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities, edited by S.J. Ceci. Hillsdale, NJ: Erlbaum.
- Rabinowitz, M., and Glaser, R. 1985. "Cognitive Structure and Process in Highly Competent Performance." Pp. 75-78 in The Gifted and the Talented: A Developmental Perspective, edited by F. D. Horowitz and M. O'Brien. Washington, DC: American Psychological Association.
- Resnick, Lauren B. (in press) "Treating mathematics as an Ill-Structured Discipline." In Research Agenda for Mathematics Education: Teaching and Assessment of Mathematical Problem Solving, edited by R. Charles and E.A. Silver. Hillsdale, NJ: Erlbaum.
- Resnick, L.B. (in press) "Knowing, Learning, and Instruction." Hillsdale, N.J.:Erlbaum.
- Resnick, Lauren. 1987a. "Constructing Knowledge in School." Pp. 19-50 in Development and Learning: Conflict or Congruence?, edited by L.S. Liben. Hillsdale, NJ: Erlbaum.
- Resnick, Lauren. 1987b. "Learning in School and Out." Educational Researcher 16:13-20.
- Resnick, L.B. 1987. "Education and Learning to Think." Washington, D.C.: National Academy Press.
- Resnick, Lauren. 1986. "The Development of Mathematical Intuition." Pp. 159-194 in Perspectives on Intellectual Development: The Minnesota Symposia on Child Psychology, edited by M. Perlmutter. Hillsdale, NJ: Erlbaum.
- Resnick, L. B., Cauzinille-Marmèche, E., and Mathieu, J. 1987. "Understanding Algebra." Pp. 169-203 in Cognitive Processes in Mathematics, by J. A. Sloboda and D. Rogers. Oxford: Clarendon Press.
- Resnick, L. B., and Omanson, S.F. 1987. "Learning to Understand Arithmetic." Pp. 41-95 in Advances in Instructional Psychology Vol. 3, edited by R. Glaser. Hillsdale, NJ: Erlbaum.
- Segal, J.W., Chipman, S.F., and Glaser, R. 1985 "Thinking and Learning Skills: Relating Instruction to Research, Vol. 1." Hillsdale, N.J.: Erlbaum.
- Schneider, Walter. 1987. "Session I Presidential Address: Connectionism: Is It a Paradigm Shift for Psychology?" Behavior Research Methods, Instruments, & Computers 19(2):73-83.

- Schneider, W., and Detweiler, M. 1987. "A Connectionist/Control Architecture for Working Memory." Pp. 54-119 in The Psychology of Learning and Motivation Vol. 21, edited by G. Bower. New York: Academic Press.
- Schofield, Janet W. 1986. "Black-White Contact in Desegregated Schools." Pp. 79-92 in Contact and Conflict in Intergroup Encounters, edited by M. Hewstone and R. Brown. Oxford, England: Basil Blackwell.
- Schofield, J. W., and Verban, D. 1988. "Computer Usage in The Teaching of Mathematics: Issues Which Need Answers." Pp. 169-193 in The Teaching of Mathematics: A Research Agenda, edited by D. Grows and T. Cooney. National Council of Teachers of Mathematics.
- Shute, Valerie, and Glaser, R. (in press) "An Intelligent Tutoring System for Exploring Principles of Economics." In Straight Thinking, edited by R. Snow and D. Wiles. San Francisco: Jossey Bass.
- Shute, V., Glaser, R., and Raghavan, K. (1988) "Inference and Discovery in an Explanatory Laboratory." Pp. 279-326 in Learning and Individual Differences, edited by P. L. Ackerman, R. J. Sternberg, and R. Glaser. San Francisco: Freeman.
- Voss, James F. (in press) "Learning and Transfer in Subject Matter Learning: A Problem Solving Model." International Journal of Educational Research.
- Voss, James F. (in press) "Problem Solving and the Educational Process." In Handbook of Psychology and Education, edited by R. Glaser and A. Lesgold. Hillsdale, NJ: Erlbaum.
- Voss, J.F., Perkins, D.N., and Segal, J., (in press). "Informal Reasoning and Instruction." Hillsdale, N.J.:Erlbaum.
- Voss, James F. 1986. "Social Studies." Pp. 205-239 in Cognition and Instruction, edited by R.F. Dillon and R.J. Sternberg. New York: Academic Press.
- Voss, J.F., Blais, J., Means, M.L., Greene, T.R., and Ahwesh, E. 1986. "Informal Reasoning and Subject Matter Knowledge in the Solving of Economics Problems by Naive and Novice Individuals." Cognition and Instruction 3:269-302.
- Voss, J.F., and Means, M.L. (in press) "Toward a Model of Creativity Based Upon Problem Solving in the Social Sciences." In Handbook of Creativity: Assessment, Theory, and Research, edited by J.A. Glover, R.R. Ronning, and C.R. Reynolds.

The Center for the Study of Learning promotes direct and expeditious publication of researchers' work through mainstream books, journals, and other forums with broad circulation among both education practitioners and the research community. For this reason, the Center does not maintain a publication series.

CENTER FOR THE STUDY OF WRITING

Graduate School of Education
University of California, Berkeley
Berkeley, California 94720
(415) 643-7022

Director: Sarah Warshauer Freedman

Co-Directors: James Gray, Linda Flower, J. R. Hayes

Assistant Director: Sandra R. Schecter

Affiliated Institution: Carnegie Mellon University

Mission

The primary mission of the Center for the Study of Writing is to improve the teaching and learning of writing from the early years through adulthood. Committed to helping all students become full-fledged participants in our literate world, the Center's research program addresses writing as (a) a means of communication, (b) a skill to be developed, and (c) a tool for learning and thinking across the disciplines. The Center encourages and promotes research that emphasizes the student as learner and the teacher's interactions with the learner. Underlying this research is the belief that effective research in writing is "practice-sensitive" and helps foster "research-sensitive" approaches on the part of educators. The Center's major objective is to build workable theories that will have conceptual and practical impact on the teaching and learning of writing as well as stimulate further research.

Programs of Research

Principal Investigators

Writing and the Writer

Anne Haas Dyson, UCB
Linda Flower, CMU
John R. Hayes, CMU

Writing and Instruction

Sarah W. Freedman, UCB
John R. Hayes, CMU
Mary Sue Ammon, UCB
Paul Ammon, UCB
Donald McQuade, UCB
Nancy Sommers, Harvard Univ.
Guadalupe Valdes, UCB
Jenny Cook-Gumperz, UCB

Interactions: Writing and Reading;
Writing and Speaking; Writing
and Computers

Anne Haas Dyson, UCB
Wallace Chafe, UC
Santa Barbara

OERI Center Liaison: Eleanor N. Chiogioji
Office of Research
Learning and Instruction Division
(202) 357-6021

Major Research Findings

o Emergent Literacy--Transition from Home to School:

If classrooms were to provide opportunities for the academic and social lives of children to mix, the academic and the social could be intertwined to be mutually supportive. To pull writing out of the network of peers is to deny children the opportunity to experience literacy as something that is functional in their lives.

There is and there can be no single description of what beginning composers do. The complex and varied processes of thinking and expression that are seen from child to child result in vastly different approaches to writing and, thus, vastly different written products. We cannot fairly judge an individual child's language skills by depending on a single standard of writing "excellence."

o Effective Instruction and Response--Transition to Secondary School in the United States and in the United Kingdom:

U.S. teachers who successfully incorporate writing in their classrooms report that the primary importance of teaching writing is to get students to think independently; in contrast, successful U.K. teachers are more interested in having students share their imaginative experiences. We need to be alert, on the one hand, to the possibility of mechanically forcing "critical thinking" or "independent thinking" and, on the other hand, of opportunities to nourish the creative and imaginative as integral elements in the development of writing and thinking skills.

U.S. teachers attribute their success to their curriculum and to the "process approach" to teaching writing, while U.K. teachers are more likely to attribute their success to getting to know individual students. This difference appears to be related to the fact that U.S. teachers seldom teach the same students for longer than a semester or year, while U.K. teachers often teach the same students for several years.

o Academic Literacy--Transition to the University:

When college students engage in the typical task of reading through an assignment which serves as the springboard for writing an essay, they vary widely in the ways they read and interpret to themselves what their writing task is to be, even if students are together in the same course with the same instructor.

College students vary widely in their awareness of their own performance or ways of knowing. This kind of awareness-- what is called metacognitive awareness--of the writing process appears not to be a well-established part of the student's writing repertory. We need to focus more on the development of these ways of knowing as we teach students to write.

o Synthesis of Research in Writing and Reading:

Writing and reading skills develop best when students perceive the relevance and usefulness of writing and reading to their academic and personal needs. If students are to develop mastery over writing and reading, then classrooms cannot deny students their own choices for what to write and read.

Classroom regimes that place great stress on grades or on frequent testing have the effect of undermining the learning value of class undertakings; they discourage the risk-taking necessary to learning and discovery.

o Spoken and Written Language:

As readers, we perceive in writing the same kinds of rises and falls in pitch, accents, pauses, rhythms, and variations in voice that we perceive in speech. One of the functions of punctuation in writing seems to be to make explicit these voice qualities. Punctuation is only sometimes strictly grammatical.

o Identifying Priorities for the Study of the Writing of Hispanic Background Students:

In the many articles written about Hispanic student writing, the students' language abilities are often treated and focused on only as problems rather than as language repertoires to build on. Hispanic students are, in a sense, penalized for knowing more than one language, as educators approach with negative perceptions these students' attempts to learn written English.

Research on the writing of Hispanic students is confounded by the inclusion of many different populations under the rubric "Hispanic," populations as varied as recent immigrants to this country who speak only Spanish to U.S.-born English speakers with Hispanic surnames, which is to say, the continuum of language users from incipient to fluent bilinguals.

Selected Accomplishments

- o Seminar Series for Researchers and Practitioners. In an effort to establish and maintain strong connections with the field, CSW sponsors a seminar series at Berkeley and one at the Carnegie Mellon site. At U.C. Berkeley, the Center Seminar Series for Researchers and Practitioners, co-sponsored with the university's Departments of English and Rhetoric, focuses on noteworthy Center-related activities for developing knowledge about the teaching and learning of writing. Attendees include local teachers and school administrators, members of the U.C. Berkeley faculty and staff, faculty members from other universities and colleges, visiting scholars, students, and alumni. Attendance for these seminars ranges from approximately 25 people to over 200 people.

The Research-for-Teaching Seminar Series at Carnegie Mellon serves as a forum for discussing research results and teaching implications with high school and college teachers and for encouraging teachers and students of writing to engage in research of their own. Several hundred teachers have participated in these seminars.

- o Dissemination Network. In addition to the usual means of disseminating the results of the Center's work (e.g., through conference presentations and published articles and books), CSW collaborates with the National Writing Project (NWP) to reach a wider audience of teachers and researchers. The NWP network, based at Berkeley, consists of close to 170 teacher training sites located at universities across the nation as well as abroad. Reaching more than 535,000 teachers nationwide, NWP is part of the Center's referral network of experts on the teaching and learning of writing.

CSW and NWP also jointly publish The Quarterly, a national publication that addresses, from the perspectives of both research and practice, current thinking in the teaching and learning of writing. For The Quarterly, the Center produces a regular feature that

reports on its research and related activities and regularly contributes articles based on individual research projects and/or seminar series talks. The Quarterly is issued four times a year and is distributed to all NWP sites, to all teacher consultant members of NWP, to all individual and institutional sponsors of NWP, and to a growing number of new constituencies. The mailing list includes more than 4000 names.

- o Research Applications Series. The Center at Berkeley and the Bay Area Writing Project are co-sponsoring a program of classroom-based teacher research on writing. Several reports of research undertaken in 1987 will be published in The Quarterly. At the Center's Carnegie Mellon site, Flower and other researchers are collaborating with the Pennsylvania Writing Project and the Pittsburgh Public Schools to establish a program of teacher research on the theme of "Making Thinking Visible."

With the National Education Association and the American Educational Research Association, the Center is coordinating a project aimed at creating a new model of collaboration between teachers and researchers through the theme of writing research. The first NEA/AERA/CSW publication will be on the topic of cultural diversity and literacy. The booklet, co-authored by Shirley Brice Heath, a Stanford University professor, and Leslie Mangiola, a teacher in the San Francisco Bay Area, is in the classroom stages.

- o Resource Library and Study Room for Teachers and Researchers. The Center maintains a growing library of books, journals, articles, and audio and video tapes related to writing and to the teaching and learning of writing. In addition, the room contains conference/study facilities and several personal computers. Teachers, Center researchers, faculty from other universities and colleges, and visiting scholars use the resource room regularly for reading, study, meetings, and seminars. The resource library and study room is conveniently located in the Graduate School of Education at Berkeley and easily accessible from all parts of the Bay Area.

Publications

Books and Articles

Dyson, Anne Haas (editor), in press. Writing and Reading: Collaboration in the Classroom? Urbana, IL: National Council of Teachers of English.

Dyson, Anne Haas, in press. The Multiple Worlds of Child Writers: A Study of Friends Learning to Write. New York: Teachers' College Press.

Flower, Linda, John R. Hayes, Linda Carey, Karen Schriver, and James Stratman, 1986. "Detection, Diagnosis, and the Strategies of Revision." College Composition and Communication 27: 25-40. [Note: for this article, the Conference on College Composition and Communication awarded the authors the Richard Braddock Award of 1986-87 for the most outstanding article on the teaching of writing in college.]

Flower, Linda, Victoria Stein, John Ackerman, Margaret Kantz, Kathleen McCormick, and Wayne Peck, in press. Reading-to Write: Exploring a Cognitive and Social Process. New York: Oxford University Press.

Freedman, Sarah W. (with Cynthia Greenleaf and Melanie Sperling), 1987. Response to Student Writing. (Research Report No. 23). Urbana, IL: National Council of Teachers of English.

Ruth, Leo, and Sandra Murphy, 1988. Designing Writing Tasks for the Assessment of Writing. Norwood, NJ: Ablex.

Center Publications

Berkenkotter, Carol, Thomas Huckin, and John Ackerman, in press. Social Context and Socially Constructed Texts: The Initiation of a Graduate Student into a Writing Research Community.

Britton, James, 1987. Writing and Reading in the Classroom (Technical Report No. 8, a joint report with the Center for the Study of Reading).

Carey, Linda J., and Flower, Linda, in press. Foundations for Creativity in the Writing Process: Rhetorical Representations of Ill-Defined Problems.

Chafe, Wallace, 1987. Punctuation and the Prosody of Written Language (Technical Report No. 11).

Cafe, Wallace, 1987. What Good is Punctuation? (Occasional Paper No. 2).

Chafe, Wallace, and Jane Danielewicz, 1987. Properties of Spoken and Written Language (Technical Report No. 5).

Clifford, Geraldine J., 1987. A Sisyphean Task: Historical Perspectives on the Relationship Between Writing and Reading Instruction (Technical Report No. 7, a joint report with the Center for the Study of Reading).

- DiPardo, Anne, 1989. Narrative Knowers, Expository Knowledge: Discourse as a Dialectic (Occasional Paper No. 6).
- DiPardo, Anne, and Sarah W. Freedman, 1987. Historical Overview: Groups in the Writing Classroom (Technical Report No. 4).
- Dyson, Anne Haas, 1988. Negotiating Among Multiple Worlds: The Space/Time Dimensions of Young Children's Composing (Technical Report No. 15).
- Dyson, Anne Haas, 1988. Drawing, Talking and Writing: Rethinking Writing Development (Occasional Paper No. 3).
- Dyson, Anne Haas, 1987. Unintentional Helping in the Primary Grades: Writing in the Children's World (Technical Report No. 2).
- Dyson, Anne Haas, 1987. Individual Differences in Beginning Composing: An Orchestral Vision of Learning to Write (Technical Report No. 9).
- Edelsky, Carole, and Sarah Hudelson, 1989. Contextual Complexities: Written Language Policies for Bilingual Programs (Occasional Paper No. 10).
- Ehri, Linnea, 1988. Movement into Word Reading and Spelling (Technical Report No. 10, a joint report with the Center for the Study of Reading).
- Flower, Linda, 1988. The Construction of Purpose in Writing and Reading (Occasional Paper No. 4).
- Flower, Linda, 1987. The Role of Task Representation in Reading-to-Write (Technical Report No. 6).
- Flower, Linda, 1987. Interpretive Acts: Cognition and the Construction of Discourse (Occasional Paper No. 1).
- Freedman, Sarah W., 1987. Peer Response Groups in Two Ninth-Grade Classrooms (Technical Report No. 12).
- Freedman, Sarah W., and Alex McLeod, 1988. National Surveys of Successful Teachers of Writing and Their Students: The United Kingdom and the United States (Technical Report No. 14).
- Freedman, Sarah W., Anne Haas Dyson, Linda Flower, and Wallace Chafe, 1987. Research in Writing: Past, Present, and Future (Technical Report No. 1).
- Gundlach, Robert, Marcia Farr, and Jenny Cook-Gumperz, 1989. Writing and Reading in the Community (Occasional Paper No. 8).

- Hull, Glynda, and Mike Rose (1989). Rethinking Remediation: Toward a Social-Cognitive Understanding of Problematic Reading and Writing. (Technical Report No. 19).
- Kantz, Margaret, 1989. Written Rhetorical Syntheses: Processes and Products. (Technical Report No. 17).
- Moffet, James, 1989. Bridges: From Personal Writing to the Formal Essay (Occasional Paper No. 9).
- Nelson, Jennie, and John R. Hayes, 1988. How the Writing Context Shapes College Students' Strategies for Writing from Sources (Technical Report No. 16).
- Rosebery, Ann S., Linda Flower, Beth Warren, Betsy Bowen, Bertram Bruce, Margaret Kantz, and Ann M. Penrose, 1989. The Problem-Solving Processes of Writers and Readers. (Occasional Paper No. 7).
- Rosenblatt, Louise M., 1988. Writing and Reading: The Transactional Theory (Technical Report No. 13, a joint report with the Center for the Study of Reading).
- Sperling, Melanie, and Sarah W. Freedman, 1987. A Good Girl Writes Like A Good Girl: Written Response and Clues to the Teaching/Learning Process (Technical Report No. 3).
- Spivey, Nancy, and James R. King, 1989. Readers as Writers Composing from Sources. (Technical Report No. 18).
- Sulzby, Elizabeth, June Barnhart, and Joyce Hieshima, 1989. Forms of Writing and Rereading from Writing: A Preliminary Report (Technical Report No. 20, a joint report with the Center for the Study of Reading).
- Tierney, Robert, Rebekah Caplan, Linnea Ehri, Mary K. Healy, and Mary Hurdlow, 1988. Reading and Writing Working Together (Occasional Paper No. 5).

Publications can be ordered directly from the Center for the Study of Writing at Berkeley. Phone or mail orders are accepted. An annotated list of publications, order form, and price list are available by calling (415) 643-7022 or by writing to the Center for the Study of Writing, Graduate School of Education, 5513 Tolman Hall, University of California, Berkeley, CA 94720.

NATIONAL CENTER FOR POSTSECONDARY GOVERNANCE AND FINANCE

University of Maryland
College of Education
Room 4114 CSS Building
College Park, Maryland 20742-2435
(301) 454-1568

Executive Director: Richard P. Chait

Associate Director for Communication and Administration:
Kathryn Theus

Director of Collaborative Activities: Robert Berdahl

Affiliated Institutions: Arizona State University; Teachers
College, Columbia University

Mission

The mission of the Center is to improve the effectiveness, efficiency, and equity of teaching, research, and public service in postsecondary education. This mission is carried out through policy research and dissemination of information designed to improve governance, management, and finance practices. The Center is pursuing the concerns of postsecondary education at the institutional, interinstitutional, State and Federal levels. This includes: (1) promoting learning through teaching, (2) creating knowledge through research and scholarship, and (3) disseminating knowledge and providing assistance through public service activities.

Programs of Research

Principal Investigators

- | | |
|--|--|
| (1) Examining postsecondary education finance | William Massy, Lee Hansen, Jacob Stampen, Gregory Jackson, John Lee, and Richard Anderson |
| (2) Examining postsecondary education governance | Robert Birnbaum, Robert Berdahl, Marvin Peterson, Richard Chait, Frank Schmidtlein, Kathryn Theus, Richard Richardson, Monique Clague, and Michael Nettles |

OERI Center Liaison: Salvatore Corrallo
Associate OERI Center Liaison: Jeffrey Gilmore
Office of Research
Higher Education and Adult Learning Division
(202) 357-6243

Major Research Findings

- o Minority students in universities vary greatly in terms of background characteristics--especially preparation and orientation toward education. Four student profiles are evident: (1) well-prepared students committed to education; (2) underprepared students who believe in education; (3) well-prepared students who nonetheless question the value of education; and (4) underprepared students who grew up where education was not valued.
- o Successful universities work with the preparation problem through early intervention programs conducted in cooperation with elementary and secondary school districts. They also provide bridge programs for marginally underprepared high school and community college graduates. Strategies for providing financial assistance and career guidance are important elements in both forms of intervention.
- o Urban community colleges and urban universities, established in the 60's as a strategy for improving access to the baccalaureate degree for disadvantaged city dwellers have frequently failed to live up to their potentials because of conflicting priorities and values.
- o Urban community colleges establish barriers to student progress toward the baccalaureate to the extent that they: (1) hold low expectations for their students and adjust standards to accommodate substandard performance; (2) emphasize vocational training to the exclusion of college parallel work at institutions enrolling high proportions of minority students; (3) fail to develop strategies to address the de facto segregation of many inner city campuses; (4) permit students to enroll in college-level classes for which they lack the prerequisite preparation; (5) offer for transfer credit courses that do not match the offerings of major receiving institutions in content, rigor, or credit format; (6) fail to provide accurate and timely advice to potential transfer students; (7) lack arrangements for regular communication with major receiving institutions including faculty to faculty contact; and (8) do not systematically follow-up their former students to evaluate the strengths and weaknesses of their transfer programs.
- o Urban universities establish barriers to achieving the baccalaureate by disadvantaged students when they: (1) place little emphasis on inner city community colleges in their recruiting activities; (2) provide multiple and confusing estimates of previously earned credits applicable to the intended degree program; (3) classify an excessive number of transfer courses as electives increasing the time required

to earn a degree; (4) employ few minorities as faculty members or senior administrators; (5) give inadequate attention to differences in academic preparation and culture among the disadvantaged students they admit; (6) fail to communicate regularly with counterparts at feeder community colleges; (7) criticize the performance of community college transfer students without collecting data on their performance and sharing such data with feeder institutions; and (8) encourage early transfer of community college students who were not eligible for university admission upon high school graduation.

- o While there are notable exceptions (Florida, for example), a majority of state coordinating boards have tolerated significant barriers to effective transfer among their publicly-supported institutions of higher education.
- o Colleges and universities can be thought of as self-correcting institutions that function by responding to problems in individual programs rather than attending to larger institutional "goals." Effective leaders in such institutions cultivate leadership within various subunits of the organization, rather than trying to personally intervene into all organizational problems, and leaders may not be required to be goal-focused rational decisionmakers, due to the self-regulating qualities of the institutions.
- o Traditional ideas about effective management developed in business organizations cannot be applied to higher education. The most important work of leaders in colleges and universities is not making decisions, but "making sense" so that organizational participants develop a shared understanding of reality. A good deal of administrative work is symbolic in nature, and consists of doing things that others believe to be things typically done by good administrators.
- o Significant differences exist among institutions, so that administrators must often "unlearn" lessons of their old positions in order to function effectively in their new jobs.
- o Presidents can be most effective by providing for the collection and dissemination of data throughout the institution, and creating forums in which organizational participants interact on agendas of interest to the president.
- o College presidents define "leadership" as a process of influence directed towards the achievement of goals, and appear to emphasize directing others rather than empowering them. College presidents are more likely to see leadership

as a one-way process of social power, rather than as a two-way process of social exchange. Presidents and faculty leaders often differ in their views of "good faculty leadership," with presidents defining faculty leadership in terms of traditional academic activities, and faculty seeing it as promoting faculty rights and welfare.

- o Presidential statements indicating concern for access do not appear to be related to increased enrollment of minority students on their campuses.
- o Most presidents report their most serious errors are made in the beginning of their presidential terms. Presidents report their most common error as neglecting to build or maintain good working relationships with someone important to the president or the institution.
- o Campus leaders are most likely to share goals at private colleges, and least likely to share them at community colleges and universities. Consistency of goals on a campus may not be related to institutional effectiveness, and goal diversity may be important to institutional success under some circumstances.

Selected Accomplishments

- o As a result of the Center's invitational conference on minority degree achievement, an informal network has been formed to advance minority achievement in higher education. The group, lead by an associate director of the center, has developed a report focusing on removing race and ethnicity as a factor in college completion.
- o The Center's Forum for College Financing Alternatives has played a lead role in discussions at the state and national levels of college savings and prepayment plans. Several issues of the forum's newsletter, distributed to more than 10,000 practitioners, policymakers, and researchers, have analyzed various tuition prepayment plans and state, national, and commercial savings plans. Since the first review of college prepayment plans in an early edition of this newsletter, nearly every state has discussed such plans, several states have enacted plans, and an even greater number of individual college and commercial plans have appeared. Forum staff have worked with several states to develop prepayment plans, including an endorsed Massachusetts plan using a modification of the "standard tuition units" proposed in the first issue of the newsletter. Forum staff also analyzed the Illinois Bond Plan (a zero-coupon bond) to be presented at the annual meeting of the National Association of State Legislators.

The Forum was also one of the sources of an idea that sprung up in several places concurrently -- the use of modified U.S. Savings Bonds (tax free EE bonds if used for college) as a vehicle to help families accumulate funds for higher education.

Publications

Books and Articles

Anderson, R.E. "New Tuition Savings Plans," Capital Ideas. Vol.1, No. 1, June 1986.

Anderson, R.E. "College Savings and Prepayment Plans," Capital Ideas. Vol. 2, Nos. 3 & 4, January 1988.

Anderson, R.E. "The Economy and Higher Education," Capital Ideas. Vol. 3, No.1, June 1988.

Anderson, R.E. "Tuition Prepurchase Plans," Change, March/April, 1987.

Anderson R.E. and Joel W. Meyerson, eds. Financing Higher Education: Strategies after Tax Reform, San Francisco: Jossey Bass, 1987.

Anderson, R.E. "Equipment Financing Ideas," Capital Ideas. Vol. 1, No. 2, September 1986.

Anderson, R.E. "Financing Higher Education After Tax Reform," Educational Record, Vol. 60, No. 2, Spring 1987.

Anderson, R. E. and Gail Franck. "Tax Reform and Higher Education," Capital Ideas. Vol. 1, Nos. 3 & 4, February 1987.

Anderson, R. E. and David C. Clapp. "New Approaches to Debt Financing," Capital Ideas. Vol. 2, No. 1, June 1987.

Anderson, R. E. and Douglas Wofford, "Mortgage-Backed Student Loans," Capital Ideas. Vol. 2, No. 2, October 1987.

Birnbaum, R. 1986. Leadership and learning: The College President as Intuitive Scientist. Review of Higher Education 9:381-395.

Birnbaum, R. 1987. The Reality and Illusion of Community College Leadership." in Colleges of Choice: The Enabling Impact of the Community College, edited by J. Eaton. New York: ACE/MacMillan.

- Birnbaum, R. 1987. (In Press). "Leadership and Followership: the Cybernetics of University Governance". In Campus Governance Reconsidered, edited by J. H. Schuster and L. Miller, Washington, D. C.: ACE/MacMillan.
- Birnbaum, R. (In Press). How Colleges Work: Patterns of Organization, Management, and Leadership in Higher Education. San Francisco: Jossey-Bass, 1988.
- Birnbaum, R. (In Press) Presidential Searches and the Discovery of Organizational Goals. Journal of Higher Education.
- Birnbaum, R. (In Press) The Latent Organizational Functions of the Academic Senate: Why Senates Don't Work But Won't Go Away. Journal of Higher Education.
- Birnbaum, R. (In Press) Presidential Succession and Institutional Functioning in Higher Education. Journal of Higher Education.
- Birnbaum, R. (In Press). Administrative Commitments and Minority Enrollments: College Presidents' Goals for Quality and Access. Review of Higher Education.
- Bensimon, Estela, Anna Neumann and Robert Birnbaum. (in press) Making Sense of Administrative Leadership: The "L" Word in Higher Education. ASHE-ERIC Higher Education Report.
- Chait, R. and Barbara Taylor. 1989 (forthcoming). Charting the Territory of Non-profit Boards. Harvard Business Review.
- Jackson, Gregory. "Financial Aid and Minority Access: Why Do We Know So Little?" Change. 20: 48-49.
- Larson, J., T. Milton and F. Schmidtlein. 1988. "Planning Perspectives," CUPA JOURNAL. Journal Article, ??pp.
- Hansen, W. Lee. 1986. What Knowledge Is Most Worth Knowing--for Economics Majors," American Economic Review 76:2, 149-152.
- Hansen, W. Lee. 1986. Changes in Faculty Salaries, in H.R. Bowen and J. Schuster, American professors: A national resource imperiled (Oxford University Press) 80-112.
- Hansen, W. Lee. (forthcoming). Merit Pay in Higher Education. in David W. Breneman and Ted I. O. Youn (eds.), Academic Labor Markets and Academic Careers in American Higher Education, Stanford Series in Education and Public Policy, (Taylor and Francis Press). 24 manuscript pages.

- Hansen, W. Lee, Roxanne Reeves and Jacob O. Stampen. 1988. Implications of Redefining Independent Student Status. Economics of Education Review 7:1, 85-100.
- Hansen W. Lee and Marilyn S. Rhodes. 1988. Student Debt Crisis: Are Students Incurring Excessive Debt? Economics of Education Review 7:1, 101-112.
- Hansen W. Lee and Marilyn S. Rhodes. 1987. Manageability of Student Debt: Before and After Reauthorization. Proceedings of the Fourth Annual NASSGP/NCHELP Research Conference on Student Financial Aid, New York: New York State Higher Education Services Corporation VI, 1-17.
- Hansen W. Lee and Jacob O. Stampen. 1987. The Economics and Financing of Higher Education: The Tension Between Quality and Equity. in P.O. Altbach and R. O. Berdahl (eds.), Higher Education in American Society. New York: Prometheus Books, 107-128.
- Hansen W. Lee and Jacob O. Stampen. 1987. The Economics and Financing of Higher Education: The Tension Between Quality and Access. Proceedings of the Fourth Annual NASSGP/NCHELP Research Conference on Student Financial Aid, New York: New York State Higher Education Services Corporation XIV, 1-30.
- Hansen W. Lee and Jacob O. Stampen. 1986. Independent Students at Two-year Institutions and the Future of Financial Aid, in S. Zwerling (ed.), The community college and its critics, New Directions for Community Colleges, no. 54 (Jossey-Bass: San Francisco) 81-90.
- Hansen, W. Lee and Roxanne W. Reeves. 1986. The Effects of Redefining Independent Student Status: The California Data. Journal of Student Financial Aid 16:2, 41-54.
- Joel W. Meyerson. "The Top Ten Business Concerns for Trustees in 1988," in AGB Reports, March/April, 1988.
- Jacob O. Stampen and Alberto F. Cabrera. 1988. The Targeting and Packaging of Student Aid and Its Effect on Attrition. Economics of Education Review 7:1, 29-46.
- Jacob O. Stampen and Alberto F. Cabrera. 1986. Exploring the Effects of Student Aid on Attrition, Journal of Student Financial Aid. 16:2, 28-40.
- Stampen, Jacob O., Roxanne W. Reeves, and W. Lee Hansen. 1988. The Impact of Student Earnings in Offsetting Unmet Need. Economics of Education Review 7:1, 113-126.

Stampen, Jacob O., Roxanne W. Reeves, and W. Lee Hansen. 1986. Coalitions in the Senates of the 96th and 97th Congresses," Congress and the Presidency 13:2, 188-208.

Jacob R. Stampen. 1987. Improving the Quality of Education: W. Edwards Deming and Effective Schools. Contemporary Education Review 3:3, 423-433.

Jacob R. Stampen.. 1987. Historical Perspective on Federal and State Financial Aid," Conversations About Financial Aid (California Postsecondary Education Commission), 5-11.

Richardson, Richard C. and Donald J. Vangsnes. 1987. "Equity and Affirmative Action." In Key Resources in Higher Education Governance, Management, and Leadership, edited by Marvin W. Peterson and Lisa A. Mets. San Francisco: Jossey-Bass.

Richardson, Richard C., Alfredo de los Santos, and Howard Simmons. 1987. "Graduating Minority Students." Change 19: 20-27.

Schmidtlein, F.A. 1987. "Administrative Structures and Decision-Making Processes" in M. Peterson and L. Mets (Eds.) Key Resources in Higher Education Governance, Management, and Leadership, San Francisco, CA: Jossey-Bass, 1987. Book Chapter, 24 pp.

Skinner, Elizabeth C. and Stephen Carter. 1987. A Second Chance for Texans: Remedial Education in Two-year Colleges. Texas Association of Junior and Community College Instructional Administrators.

Skinner, Elizabeth F. and Richard C. Richardson. 1988. Making It in a Majority University. Change 20: 34-47.

Theus, Kathryn. "Campus-Based Community Service: New Populism or Smoke and Mirrors?" Change 20: 39-44.

Center Publications

Bensimon, E.M. "The Discovery Stage of Presidential Succession." (OP 87:15 \$4)

Bensimon, E.M. "The Meaning of "Good Presidential Leadership": A Frame Analysis." (OP 87:16 \$4)

Bensimon, E.M. "Viewing the Presidency: Perceptual Congruence Between Presidents and Leaders on their Campuses" (OP 88:3 \$4)

- Birnbaum, R. "The Cybernetic University: Toward an Integration of Governance Theories." (OP 88:9 \$4)
- Birnbaum, R. "The Implicit Leadership Theories of College and University Presidents." (OP 87:17 \$4)
- Birnbaum, R. "Individual Preferences and Organizational Goals: Consistency and Diversity in the Futures Desired by Campus Leaders." (OP 87:18 \$4)
- Birnbaum, R. "The Latent Organizational Functions of the Academic Senate: Why Senates Don't Work But Won't Go Away." (OP 87:1 \$4)
- Birnbaum, R. "Leadership and Followership: The Cybernetics of University Governance." (OP 88:10 \$4)
- Birnbaum, R. "Presidential Succession and Institutional Functioning in Higher Education." (OP 87:2 \$4)
- Birnbaum, R. "Presidential Searches and the Discovery of Organizational Goals." (OP 87:4 \$4)
- Birnbaum, R. "Responsibility Without Authority: The Impossible Job of the College President." (OP 88:7 \$5)
- Birnbaum, R. "When College Presidents are Wrong: The Effects of Knowledge Structures and Judgmental Heuristics on Administrative Inferences." (OP 87:6 \$4)
- Birnbaum, R. "'How'm I Doin'? : How College Presidents Assess their Effectiveness" (OP 88:4 \$4)
- Chaffee, E. "Variations on a Theme: Leadership." (OP 88:12 \$4)
- Chait, R. and Taylor, B. "Evaluating Boards of Trustees: In Theory and In Practice." (OP 87:19 \$4)
- Chait, R.P. "A Plan for Communicating Results of Research on Postsecondary Governance and Finance." (OP 87:10 \$4)
- Clapp, D.C. "What's New in Debt Financing in Higher Education." (OP 86:1 \$5)
- Hansen, W.L. and Stampen, J.O. "Balancing Quality and Access in Financing Higher Education". (OP 87:5 \$4)
- Hollander, E.P. "College and University Leadership From a Social Psychological Perspective: A Transactional View". (OP 87:11 \$5)

Kellerman, B. "The Politics of Leadership in America: Implications for Higher Education" (OP 88:1 \$5)

Neumann, A. "Defining "Good Faculty Leadership: Interpretations of Professors and Presidents." (OP 87:21 \$4)

Neumann, A. "Strategic Leadership: The Changing Orientations of College Presidents." (OP 87:22 \$4)

Neumann, A. "Making Mistakes: Error and Learning in the College Presidency" (OP 88:5 \$4)

Raskind, L.J. "Federal Tax Problems in Prepaid Tuition Plans" (OP 87:32 \$4)

Richardson, R.C., Gifford, B., Strang, E. "Organizational Structure and Process: A Consulting Report to the President of Central Arizona College." (OP 87:7 \$4)

Skinner, E.F. and Carter, S. "Remedial Education Study." Texas Association of Community College Instructional Administrators, (OP 87:3 \$4)

Tierney, W.G. "Symbolism and Presidential Perceptions of Leadership." (OP 87:23 \$4)

Research Reports

Berdahl, R.O. and Folger, J. "Evaluating Statewide Boards". (RR 87:3 \$6)

Hansen, W.L. and Stampen, J.O. "The Nation's Investment in Postsecondary Education". (RR 87:4 \$6)

Lee, J.B. "The Equity of Higher Education Subsidies." (RR 87:1 \$4)

Lee, J.B. "College Costs and Tuition: What are the Issues?" Proceedings from a national invitational conference. (RR 88:2 \$10)

Mason, Ward E. "Disseminating Findings of Research on Postsecondary Governance and Finance." Conference proceedings. (RR 87:2 \$6)

Richardson, R.C. and de los Santos, A.G. "From Access to Achievement: Strategies for Urban Institutions" Proceedings from a national invitational conference (RR 88:1 \$15)

Publications may be obtained by writing to:

National Center for Postsecondary Governance and Finance
4114 CSS Building
University of Maryland
College Park, MD 20742-2435

NATIONAL CENTER FOR RESEARCH ON TEACHER EDUCATION

College of Education
Michigan State University
Erickson Hall
East Lansing, Michigan 48824-1034
(517) 355-9302

Director: Mary Kennedy

Associate Directors: Sharon Feiman-Nemser; Robert Floden;
G. Williamson McDiarmid

Affiliated Institutions: University of Wisconsin-Madison;
Education Matters, Inc.-Cambridge,
Massachusetts; Teachers College,
Columbia University

Mission

The National Center for Research on Teacher Education seeks to produce useful knowledge to improve the quality of teacher education. The center views teacher education as one of many influences on teachers and examines the purpose and role of programs relative to these other influences. It asks what impact various approaches or alternatives to teacher education have on teachers and how particular kinds of learning opportunities influence teachers. These questions are examined as they relate to the teaching of two academic subjects: writing and mathematics. To date, there has been more argument than inquiry about these questions, and the issues have rarely been defined in a way that allowed careful investigation. Therefore, the Center's work consists as much of conceptual development as it does of gathering empirical data. The goal is to improve and expand conceptual and empirical studies of teacher education and teacher learning and, in so doing, to help focus debates about teacher education and inform teacher education policy and practice.

Programs of Research

A Study of Program Purposes

A Study of Program Character
and Quality

A Study of Teacher Learning

Instrument Development

Principal Investigators

Robert Floden

Mary Kennedy

Mary Kennedy
Robert Floden

G. Williamson McDiarmid

OERI Center Liaison: Elizabeth A. Ashburn
Office of Research
Schools and School Professionals Division
(202) 357-6207

Major Findings and Accomplishments

- o Preliminary analyses of center data from teacher interviews suggest that many teachers of mathematics have a limited understanding of what they teach in this field. For example, while most prospective teachers can divide fractions using the rule to "invert and multiply," many few are able to connect any meaning to that procedure. Similarly, study findings show that prospective teachers know the steps for multiplying large numbers, yet they often cannot explain why the numbers "move over" in the partial products. A center researcher summarizes such findings as follows: "First, learning to do mathematics in school, given the ways it is typically taught, does not equip even the successful student with adequate or appropriate knowledge of or about mathematics. Second, knowing mathematics for oneself may not be the same as knowing it in order to teach it Third, subject matter knowledge does not exist separately in teaching, but shapes and is shaped by other kinds of knowledge and beliefs."
- o The Center has developed a new way of measuring teachers' knowledge and changes in their knowledge. These instruments, based on a conceptual framework described in a center paper entitled "Tracking Teacher Learning," are expected to play a critical role in making teacher education a more effective intervention in preparing people to teach well. Already these instruments are being used in other countries: in Australia, at the Northern Rivers College of Advanced Education; in Sri Lanka, at the National Institute of Education; in Iceland, at the University of Iceland. A manual will be developed for widespread use of the instruments by teacher education practitioners as well as by researchers.
- o The Center has developed a new approach to defining the goals for teacher education. This conception compares the education of teachers, lawyers, engineers, and those in other professions to identify four kinds of expertise which professional educators try to foster: technical skills, knowledge of general principles, the ability to engage in critical analysis, and the ability to engage in deliberate action. The analysis also examines implications of these

kinds of expertise for the practice of teacher education, and delineates current methods for fostering expertise.

- o The Center has developed a new format for disseminating research findings to teacher education practitioners. The purpose of this "interactive dissemination" is to fully involve practitioners with the central issues of the research agenda, so they can understand the usefulness of the research as well as become participants in defining the research issues. This approach is designed to overcome the communication barrier which often exists between researchers and practitioners. It consists of exercises which pose real-life questions about teaching expertise and the role of experience in learning to teach. With further refinements, this approach to "diffusion of ideas" (as opposed to dissemination of products and presentations) is expected to have a long-range and significant influence on teacher education practices.

Publications

Books and Articles

- Ball, Deborah, L. In press. "Research on Teaching Mathematics: Making Subject Matter Knowledge Part of the Equation" in Advances in Research on Teaching Vol. 2. Teachers' Subject Matter Knowledge and Classroom Instruction, edited by J. Brophy. Greenwich, CT: JAI Press.
- Ball, Deborah, L. 1988. "Unlearning to Teach Mathematics." For the Learning of Mathematics 8(1):40-48.
- Buchmann, Margret. 1988. "Teaching Knowledge: The Lights that Teachers Live By." Oxford Review of Education 13:151-64.
- Cohen, David, K. In press. "Teaching Practice: Plus Ca Change." in Contribution to Educational Change: Perspectives on Research in Practice (National Society for the Study of Education Series on Contemporary Issues), edited by P. Jackson. Berkeley, CA: McCutchan.
- Floden, Robert, E., and Christopher M. Clark. 1988. "Preparing Teachers for Uncertainty." Teachers College Record 89:505-24.
- Kennedy, Mary, M. 1988. "Inexact Sciences: Professional Education and the Development of Expertise." Pp 133-67 in Review of Research in Education Vol 14, edited by E.Z. Rothkopf. Washington, DC: American Educational Research Association.

Mosenthal, James, H., and Carol Sue Englert (1987). "The Beginning Capacity to Teaching Writing." Remedial and Special Education 8(6):38-47.

Center Publications

Ball, Deborah, L. 1988a. Research on Teaching Mathematics: Making Subject Matter Knowledge Part of the Equation. (Research Report 88-2).

Ball, Deborah, L. 1988b. The Subject Matter Preparation of Prospective Mathematics Teachers: Challenging the Myths (Research Report 88-3).

Ball, Deborah, L. 1988c. Unlearning to Teach Mathematics (Issue Paper 88-1).

Barnes, Henrietta, L. 1987. Intentions, Problems and Dilemmas: Assessing Teacher Knowledge Through a Case Method System (Issue Paper 87-3).

Buchmann, Margret. 1987. Teaching Knowledge: The Lights Teachers Live By (Issue Paper 87-1).

Cohen, David, K. 1988. Teaching Practice: Plus Ca Change . . . (Issue Paper 88-3).

Feiman-Nemser, Sharon (Ed). 1987. Teacher Education and Learning to Teach: Proceedings of the First Annual NCRTE Retreat (Conference Series 87-1).

Floden, Robert, E., and Christopher, M. Clark 1987. Preparing Teachers for Uncertainty (Issue Paper 87-4).

Freeman, Donald, J. 1988. Compendium of Items for Follow-up of Teacher Education Programs (Technical Series 88-1).

Gomez, Mary, L. 1988. The National Writing Project: Creating Community, Validating Experience, and Expanding Professional Opportunities (Issue Paper 88-2).

Kennedy, Mary, M. 1987. Inexact Sciences: Professional Education and the Development of Experience (Issue Paper 87-2).

McDiarmid, G. Williamson, and Deborah L. Ball. 1988. "Many Moons": Understanding Teacher Learning from a Teacher Education Perspective (Issue Paper 88-5).

McDiarnid, G. Williamson, Deborah L. Ball, and Charles W. Anderson. In press. Why Staying Ahead Doesn't Work: Subject-Specific Pedagogy (Issue Paper 88-6).

NCRTE. In Press. Teacher Education and Learning to Teach (Issue Paper 88-7).

NCRTE. 1988. Dialogues in Teacher Education (Issue Paper 88-4).

Schram, Pamela, Sandra Wilcox, and Glenda Lappan. In press. Changing Mathematical Conceptions of Preservice Teachers: A Content and Pedagogical Intervention (Research Report 88-4).

Zeichner, Kenneth, M. 1988. Understanding the Character and Quality of Academic and Professional Components of Teacher Education (Research Report 88-1).

List of Publications can be obtained by writing to:

Publication List
National Center for Research on Teacher Education
Michigan State University
College of Education
116 Erickson Hall
East Lansing, MI 48824-1034

NATIONAL CENTER ON EFFECTIVE SECONDARY SCHOOLS

Wisconsin Center for Education Research
University of Wisconsin
1025 West Johnson Street
Madison, Wisconsin 53706
(608) 263-7575

Director: Fred M. Newmann

Associate Director: Gary Wehlage

Dissemination Coordinator: Anne Turnbaugh Lockwood

Mission

The Center studies how to improve student achievement in secondary schools. Special attention is directed to the needs of disadvantaged and less successful students. Research on improving academic achievement is guided by three central assumptions: (1) since the concept and measurement of achievement are problematic, the mission should not be simply to increase student scores on tests currently in use; (2) to improve academic achievement, we must first understand how to increase student engagement in academic work; and (3) although policies and conditions originating beyond the school have substantial impact on student achievement, more attention must be given to the strategies that teachers and administrators can use to alter conditions in schools so that students' engagement and achievement will be increased.

Programs of Research

Principal Investigators

Clearinghouse on Academic
Achievement

Fred Newmann

Non-Instructional Influences on
Adolescence Engagement and
Achievement

B. Bradford Brown
and Laurence Steinberg

The Stratification of Learning
Opportunities in Middle and
High Schools

Adam Gamoran and
Martin Nystrand

Higher-Order Thinking in the High
School Curriculum

Fred Newmann

Programs and Policies to Serve
At-Risk Students

Gary Wehlage

OERI Center Liaison: Oliver Moles
Office of Research
Schools and School Professionals
(202) 357-6207

Major Research Findings

- o Within exemplary social studies departments, high levels of classroom thoughtfulness can be achieved with students of all ability levels when the department chair and principal support programmatic efforts for higher order thinking.
- o Students report that classes and lessons that challenge them to use their minds are often their most engaging classes.
- o Even in successful departments, significant barriers must be overcome in order to promote higher-order thinking. Some of these obstacles are large class size, lack of effective instructional materials, pressure to cover broad surveys of information which leaves little time for in-depth reflection, and teachers' sense of inadequacy in conducting discussions.
- o Students at risk of dropping out come from middle as well as low SES backgrounds, and their academic achievement ranges broadly with many scoring above the 50th percentile on standardized math and reading tests.
- o Conditions essential to school effectiveness with at-risk youth include a professional culture built around an extended teacher role; a sense of personal responsibility for student success; a high degree of collegiality and self-governance; and sufficient autonomy to engage in educational entrepreneurship. Successful programs served pregnant girls, inner-city blacks and Hispanics, and poor rural white youth by identifying students; common characteristics and personalizing their education.
- o Students in the college track learn more than students who are not in this track, even after initial differences and selection are taken into account. Moreover, the size of the between-track achievement gap is, in most cases, larger than the achievement difference between students who stay in school and those who drop out.

- o Differences in coursetaking accounts for a large portion of the achievement gap in math and science, but not in reading, vocabulary, writing, or civics. The most likely explanations for the remaining track differences are, in order of importance, differences in instruction, variation in students' attitudes toward school, and differences in students' expectations regarding future education.
- o Ninth grade is a year of difficult adjustment for most students as they struggle with harder classes and the increasing significance of grades. Students report that peers are much more useful than parents in helping them make the transition to ninth grade, and that peers are a positive influence on their achievement.
- o Authoritative parenting strategies appear more effective than authoritarian or permissive strategies in motivating student engagement and achievement.
- o There is a notable tension between the concept of an ideal American high school for all and the reality of actual differences in school climate and classroom discourse due to class and ethnicity. This suggests the need for alternative conceptions of schooling to match reality.
- o Teachers' work consists of transforming, even molding, students, but in doing this teachers depend considerably on students' good will and cooperative spirit. Therefore, students need to be treated as active partners in education.
- o Teachers expect most students in a homogenous community to step into roles like those of the dominant or average adults in that community; as a consequence, if teachers perceive the community's culture as illegitimate or unacceptable, tremendous tensions will result in their own sense of mission and their relationships with students.

Selected Accomplishments

- o The Center developed a monograph, Beyond Standardized Testing: Assessing Academic Achievement in the Secondary School, by Fred M. Newmann and Doug A. Archbald, which was published Summer 1988 by the National Association of Secondary School Principals. The monograph describes how to move beyond standardized tests to more accurately assess student achievement in high schools. NASSP has mailed the monograph to the more than 40,000 members of that organization; it is also available to the public through NASSP. The monograph has received the attention of national press (Education Week, NEA Today).

- o As part of a long-term project on programs for at-risk youth, Center staff have developed a concept of dropout prevention that emphasizes "school membership." Successful schools create a supportive community in which students feel they belong to the school and the adults care about them. This concept is discussed in a book by Center staff to be published early 1989 by Falmer Press: Reducing the Risk: Schools as Communities of Support. The concept has been incorporated into guidelines for the New Futures Initiative; a major reform effort in five U.S. cities supported by the Annie E. Casey Foundation.
- o The Center hosted a conference on structural change in secondary schools in May 1987, convening a group of practitioners and policymakers from across the country in a working session that resulted in the book, Restructuring Secondary Schools, that will be published by SUNY Press. The book includes papers by practitioners from urban and rural secondary schools who describe the difficult restructuring process; also analytic and historical commentary on the problem. The monograph is part of a long-term Center investigation into structural change in secondary schools.
- o The Center regularly mails newsletters and resource bulletins to more than 4,000 practitioners, policymakers and researchers. Newsletters have covered such topics as "At-Risk Students," "Higher Order Thinking," "Standardized Testing," "Moral Education," "Choice in Urban High Schools." Resource bulletins have focused on "Discipline," "School-Business Partnerships," "Support Groups," "Cooperative Learning," and "Student Recognition Programs."
- o The Center publishes a semi-annual Bibliography on topics related to secondary education that is available at no charge on a single copy basis to the general public. It also operates a Clearinghouse that performs selective database searches upon request.
- o The Center publishes an on-going series of research syntheses (available at cost) on topics such as cooperative learning, staff development, stratification of learning opportunities, class size, the high school as community, the instructional role of the principal as leader, and higher order thinking in adolescents.

Publications

Books and Articles

- Archbald, D., & Newmann, F.M. (1988). Beyond standardized tests: Improving the assessment of academic achievement in high schools. Reston, VA: National Association of Secondary School Principals.
- Brown, B. B. (1988). The vital agenda for research on extracurricular influences: A reply to Holland and Andre. Review of Educational Research, 58, 107-111.
- Brown, B. B. (In press). The role of the peer group in adolescents' adjustment to secondary school. In T. Berndt & G. Ladd (Eds.), Peer relationships in child development. New York: Wiley.
- Brown, B. B. (In press). The vital agenda for research on extracurricular influences: A reply to Holland and Andre. Review of Educational Research.
- Gaddy, G.D. (1988, August). High school order and academic achievement. American Journal of Education, 96(4).
- Gamoran, A. (1987). Organization, instruction, and the effects of ability grouping: Comment on Slavin's "Best-evidence synthesis." Review of Educational Research, 57, 341-345.
- Gamoran, A. (1987, July). The stratification of high school learning opportunities. Sociology of Education, 60, 135-155.
- Gamoran, A., & Berends, M. (1987, Winter). The effects of stratification in secondary schools: Synthesis of survey and ethnographic research. Review of Educational Research, 57, 4, pp. 415-435.
- Gamoran, A. (1988). Resource allocation and the effects of schooling: A sociological perspective. In David Monk (Ed.), Yearbook of the American Educational Finance Association, 1988.
- Gamoran, A. (forthcoming). Measuring curriculum differentiation. American Journal of Education.
- Gamoran, A., & Mare, R.D. (forthcoming). Secondary school tracking and educational inequality: Compensation, reinforcement, or neutrality? American Journal of Sociology.
- Greenberger, E., & Steinberg, L. (1986). When teenagers work: The psychological and social costs of adolescent employment. New York: Basic Books.

- Lesko, N. (1988). Symbolizing society: Stories, rights, and structures in a Catholic high school. Barcome, Lewes: Falmer.
- Lockwood, A. L. (1988, October). Public secondary schools and moral education. Education Digest, 15-18.
- Lockwood, A. T. (1988, January). Schools must change to save at-risk kids. The Wingspread Journal, 9(4).
- Lockwood, A. T. (1989, January). An interview with the authors. NASSP Bulletin. Reducing the risk: Schools as Communities of support.
- Metz, M.H. (1987, January). Teachers' pride in craft, school subcultures, and societal pressures. Educational Policy, 1(1).
- Metz, M.H. (1988, November). Some missing elements in the reform movement. Educational Administration Quarterly.
- Metz, M.H. (1988, January). In education, magnets attract controversy. Issues '88, a special issue of NEA Today, 6(6), 54-56.
- Metz, M. H. (forthcoming). How social class differences shape the context of teachers' work. In M. McLaughlin & J. Talbert (Eds.), The secondary school workplace, NY: Teachers College Press.
- Newmann, F. M. (1986). A new metaphor for U.S. high schools provides fresh and powerful insights [Review of The shopping school mall high school]. Phi Delta Kappan, 67, 684-686.
- Newmann, F. M. (1986, April/May). Priorities for the future: Toward a common agenda. Social Education, 50, 240-250.
- Newmann, F. M. (1987, July/August). Citizenship education in the United States: A statement of needs. National Civic Review, (4), 280-287.
- Newmann, F. M. (1988, January). Can depth replace coverage in the high school curriculum? Phi Delta Kappan, 69(5), 345-348.
- Newmann, F.M. (in press). Higher order thinking in the teaching of social studies: Connections between theory and practice. Informal reasoning and education. D. Perkins, J. Segal, & J. Voss (Eds.), Hillsdale, NJ: Erlbaum.
- Newmann, F.M. (1988, April). Can depth replace coverage in the high school curriculum? (Translated in French) Prospectives, 24(2), 80-84. (Montreal, Quebec).

- Newmann, F.M. (1988, May). Depth or coverage in the school curriculum? Education Digest, 8-11.
- Newmann, F.M. (1988, May). Higher order thinking in the high school curriculum. NASSP Bulletin, 72(508), 58-64.
- Newmann, F.M. (1988, October). Another view of cultural literacy: Go for depth. Social Education, 432-436.
- Newmann, F.M. (forthcoming). Higher order thinking in the high school curriculum. The Education Digest.
- Newmann, F.M. (in press). Student engagement and high school reform. Educational Leadership.
- Newmann, F.M., Rutter, R.A. & Smith, M.S. (in press). Organizational factors affecting school sense of efficacy, community and expectations. Sociology of Education.
- Nystrand, M. (1986). The structure of written communication: Studies in reciprocity between writers and readers. Orlando, FL & London: Academic Press.
- Nystrand, M. (forthcoming) A social-interactive model of writing. Written Communication.
- Nystrand, M. (forthcoming). On teaching writing as a verb rather than a noun: Research on writing for high school English teachers. In G. Hawisher & A. Soter (Eds.), Essays on the teaching of English in the secondary school. NY: SUNY-Albany Press.
- Purkey, S. C. (Ed.). (in press). Restructuring secondary schools. Albany, NY: SUNY Press.
- Purkey, S.C., & Rutter, R.A. (in press). High school teaching: Teacher practices and beliefs in urban and suburban public schools. Educational Policy.
- Purkey, S.C., Rutter, R.A., Newmann, F.M. (1986-87, Winter). U.S. high school improvement programs: A profile from the high school and beyond supplemental survey. Metropolitan Education, 3, p. 59-91.
- Rossmiller, R.A. (1987). Achieving equity and effectiveness in schooling. Journal of Education Finance, XIII(4), 561-577.
- Rossmiller, R., & Cohn. E. (1987). Research on effective schools: Implications for less developed countries. Comparative Educational Review, (3), 377-399.

Rutter, R. A. (1986, April/May). A profile of the profession. Social Education, 50(4), 252-255.

School of Education Newsletter. (1987, December). Educational reform: Finding the right approach. Vol. 16, No. 5. Madison, WI: University of Wisconsin. (A summary of F.M. Newmann paper Student Engagement and high school reform.)

Schrag, F. (1988). Thinking in school and society. London: Routledge.

Schrag, F. (1987). Thoughtfulness: Is high school the place for thinking? Educational Digest, 16-19.

Schrag, F. (in press). Are there levels of thinking? Teachers College Record.

Smith, G. (forthcoming). The media academy: Engaging students in meaningful work. Educational Leadership.

Stevenson, R.B. (1987). Staff development for effective secondary schools: A synthesis of research. Teaching and Teacher Education, (3), 233-248.

Stevenson, R.B. (1987). Autonomy and support: The dual needs of urban high schools. Urban Education, 22(3), 366-386.

Turnbaugh, A. (1986, October). Center hosts site visitors: Urban high schools improving, but many problems remain. School of Education Newsletter, 15(5).

Wehlage, G.G. (1986, Fall). At-risk students and the need for high school reform. Education, 107(1), 18-28.

Wehlage, G.G. (in press). Dropping out: Can schools be expected to prevent it? In L. Weis, E. Farrar, & H. Petrie (Eds.), Dropouts from schools: Issues, dilemmas and solutions. Albany, NY: SUNY Press.

Wehlage, G. G. (in press). Engagement, not remediation or higher standards. In J. Lakebrink, (Ed.), Children at risk. Springfield, IL: Charles C. Thomas.

Wehlage, G.G. (1988, March 23). Truants: The 'invisible' 10 percent on the road to dropping out. Education Week, 1-23.

Wehlage, G.G., Rutter, R.A., Smith, G.A., Lesko, N., & Fernandez, R.R. (in press). Reducing the risk: Schools as communities of support. London: Falmer Press.

Wehlage, G., Rutter, R., & Turnbaugh, A. (1987). Evaluation of a model program for at-risk students. In Dropouts, pushouts, and other casualties. Bloomington, IN: Center on Evaluation, Development, Research, Phi Delta Kappa HOT Topics Series.

Wehlage, G., Rutter, R., & Turnbaugh. (1987, March). A program for at-risk high school students. Educational Leadership, (6), 70-73.

Center Publications

Bryk, A. S. & Driscoll, M. E. (1988, December). The high school as community: Contextual influences, and consequences for students and teachers. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$7.

Bennett, S. (1987, September). New dimensions in research on class size and academic achievement. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

Gamoran, A., & Berends, M. (1987, Winter). The effects of stratification in secondary schools: Synthesis of survey and ethnographic research. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

Keating, D.P. (1988, December). Adolescents' ability to engage in critical thinking. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

**Lockwood, A.T. (Fall-Winter 1987). Support groups in high schools. Center resource bulletin. Madison, WI: National Center on Effective Secondary Schools.

**Lockwood, A.T. (Fall, 1987). Standardized testing: Problem or solution? Center newsletter. Madison, WI: National Center on Effective Secondary Schools.

**Lockwood, A.T. (1988, Spring). Moral education? Center newsletter, 3(1), Madison, WI: National Center on Effective Secondary Schools.

**Lockwood, A.T. (1988, Spring). Cooperative learning. Resource Bulletin, 4. Madison, WI: National Center on Effective Secondary Schools.

**Lockwood, A.T. (1988, Fall). Student recognition programs. Resource Bulletin, 5. Madison, WI: National Center on Effective Secondary Schools.

****Lockwood, A.T.** (1988, Fall). Choosing urban high schools: Who benefits? Center newsletter. Madison, WI: National Center on Effective Secondary Schools.

****National Center on Effective Secondary Schools.** (1988, Fall.) Bibliography of research related to secondary education. Madison, WI: National Center on Effective Secondary Schools.

Newmann, F.M., & Thompson, J.A. (1987, September). Effects of cooperative learning on academic achievement in secondary schools: A summary of research. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

***Patterson, J.** (Ed.). (1986). Computers and complex thinking. Center computer newsletter. (Final issue).

***Patterson, J.P.** (May, 1986.) Computers and Complex Thinking. Madison, WI: National Center on Effective Secondary Schools.

Steinberg, L., Brown, B.B., Cider, M., Kaczmarek, N., & Lazzaro, C. (1988, September). Noninstructional influences on high school student achievement: The contributions of parents, peers, extracurricular activities, and part-time work. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

Stevenson, R.B. (1987, September). Staff development for effective secondary schools: A synthesis of research. Madison, WI: National Center on Effective Secondary Schools. (Center synthesis), \$5.

***Turnbaugh, A.** (1986, Fall). What does it mean to be at-risk? Center newsletter, 1(1). Madison, WI; National Center on Effective Secondary Schools.

***Turnbaugh, A.** (1986, Fall). Discipline. Center resource bulletin. Madison, WI: National Center on Effective Secondary Schools.

***Turnbaugh, A.** (Spring, 1987 No. 2) School-business partnerships. Center resource bulletin. Madison, WI: National Center on Effective Secondary Schools.

To obtain copies of Center publications, please consult code.

*Publications with a single star are no longer available.
**Publications with a double star are available from the Center by request on a single copy basis while supply lasts. Center

syntheses are available at cost through the WCER Document Service, pre-paid, Rm. 242, 1025 W. Johnson St., Madison, WI 53706.

**NATIONAL CENTER FOR RESEARCH TO IMPROVE POSTSECONDARY TEACHING
AND LEARNING**

School of Education
University of Michigan
Suite 2400 - School of Education Building
Ann Arbor, Michigan 48108-1259
(313) 936-2741

Director: Joan S. Stark

Associate Director: Wilbert J. McKeachie

Mission

The Center focuses research, development and dissemination activities on college classroom learning and teaching strategies, curricular structure and integration, faculty attitudes and teaching behaviors, organizational practices, and use of emerging information technology. It emphasizes cognitive development of undergraduate students in colleges that concentrate on teaching as their primary mission. This emphasis was chosen because recent research in cognition holds great promise for improving learning and teaching in higher education.

Programs of Research

Principal Investigator

Program on Research Leadership,
Design, and Integration

Wilbert J. McKeachie
Joan S. Stark

Program on Classroom
Teaching and Learning
Strategies

Wilbert J. McKeachie
Paul R. Pintrich

Program on Curricular
Influences and Impacts

Joan S. Stark

Program on Faculty as a Key
Resource

Robert T. Blackburn

Program on the Organizational
Context for Teaching
and Learning

Marvin W. Peterson

Program on Learning, Teaching,
and Technology

Robert B. Kozma

OERI Center Liaison: Joseph Conaty
Office of Research
Higher Education and Adult Learning Division
(202) 357-6243

Major Research Findings

- o Improvements in problem-solving and critical thinking and critical thinking abilities, which vary with each discipline, are best achieved when (a) students are involved in the discussions, (b) problem-solving methods are given explicit emphasis, (c) the dynamics of methods and strategies are expressed explicitly. Although good teachers intuitively teach students how to think, these processes must be made explicit and systematic so they can be used by other teachers.
- o Reinforcement by rewards or simple praise does not necessarily increase student motivation for learning; the effect depends on the context of the instructional setting, the informational value of feedback, and the student's interpretation of feedback.
- o Findings from the Motivated Strategies for Learning Questionnaire (MSLQ) under development indicate five different types of students: typically excellent and typically poor students and three types of average students. Average students include (1) those who are who are motivated but seem to lack good study skills, (2) those who have good study skills but are not confident of their abilities, and (3) those who have good study skills but are not interested in the course content. These results suggest the possibility of different types of treatments, such as study skills training or self-efficacy training, for different types of students.
- o Students' study methods and test taking behavior affects, and is affected by, test anxiety. Many highly anxious students use ineffective study methods. Students need to be shown that different strategies are more effective in different circumstances. Learning strategies can be taught, but they are best taught directly and specifically.
- o Unlike K-12 teachers, college faculty seldom describe making choices among alternative instructional strategies. Faculty course planning is most strongly influenced by the knowledge base of their discipline, course materials, and student characteristics.

- o Individual faculty beliefs about the goals of education heavily influence course planning. Two common beliefs are (a) the effectiveness of education to help students become better thinkers and (b) the ability of education to 'make the world a better place.' Faculty commonly try to link these beliefs with characteristics of their discipline. Students generally seem aware of the personal beliefs that influence their professors.
- o Despite little or no training in course planning, faculty approach the task with some excitement and creativity. It is clear from the interviews that faculty welcome the opportunity to reflect on how they plan their courses. Interestingly, some faculty have adapted portions of the NCRIPTAL survey instruments into their own course planning activities.
- o Faculty behavior differs dramatically across both institutional types and disciplinary boundaries. Teaching behavior is influenced strongly by the perceived quality of the students and the resources available.
- o To-date, performance evaluation of faculty has been, at best, marginal; at worst, it can produce changes opposite what is intended. No satisfactory system has evolved. A uniform system discriminates against those whose specialty does not fit the model (e.g. fine arts) and causes faculty to change their behavior to fit the existing reward structure rather than to increase their effectiveness as teachers. It appears that in order to be effective, faculty performance appraisal must be individualized.
- o Faculty who believe their teaching significantly affects students devote a higher proportion of their effort to instruction.
- o A survey of 300 academic administrators revealed thirty problem areas and 111 academic management practices apparently affect the quality of undergraduate education.
- o Insufficient financial resources for facilities and operating support and faculty development are the most often cited barriers to improving undergraduate education. The most effective academic practices for improving undergraduate education do not, however, seem to link directly to financial resources.
- o The second largest set of barriers to improving undergraduate education relate to faculty--balancing teaching and research roles, retaining good faculty, and engendering high morale. Administrators report few

institutional rewards for teaching, and they sense faculty are reluctant to change their teaching.

- o Administrators report that student problems include poor attitudes toward study and scholarship and poor preparation in basic skills.
- o The most commonly found academic management practices intended to improve undergraduate education relate to (1) academic planning, (2) institutionwide emphasis on undergraduate education, (3) academic management information systems, (4) admissions and enrollment management, (5) technology, and (6) faculty selection and promotion. Least common practices relate to (1) academic administration leadership, (2) faculty development, (3) and student assessment. Newest practices relate to (1) academic planning, (2) emphasis on undergraduate education, (3) admissions and enrollment management, (4) technology, and (5) student assessment.
- o Administrators report the most effective practices for improving teaching and learning relate to (1) faculty recruitment (2) technology use, (3) rewarding effective teaching, (4) academic planning, and (5) emphasizing undergraduate education. Least effective practices relate to (1) student assessment, (2) administrative leadership, (3) faculty development, and (4) teaching improvement programs.
- o Computers can make a significant contribution to learning in higher education in part because they can present, receive, process, and manage information as people do. Furthermore, software can be adapted to different types of learners. It allows easy individualization of lessons, greater freedom from time constraints, and greater efficiency in laboratory experiments.
- o Tutorial software provides the structure needed by learners who lack relevant knowledge, skills, and strategies for learning, and it is more likely to improve verbal knowledge tasks. Guided simulations combine structure and open-endedness and are likely to benefit average students, particularly on procedural tasks. Exploratory environments are likely to benefit only self-regulated learners. Tools range from simple aids to getting work done (calculators, word processors) to sophisticated programs that challenge students to bring their own skills and knowledge to bear on the learning task.
- o Currently, much of the software in higher education is 'homegrown' rather than commercially developed, although software publishers often distribute successful software.

Institutions are beginning to encourage both the development of educational software and its use in the classroom. Award programs, such as the EDUCOM/NCRIPTAL Higher Education Software Awards, encourage faculty to develop software that is educationally sound so institutions can use it with confidence.

Selected Accomplishments

- o The Center established the annual EDUCOM/NCRIPTAL Higher Education Software Awards program to reward and encourage the development of computer software for undergraduate education. In its first two years, the program has elicited an overwhelming response. At the recent EDUCOM conference, over 2500 conference participants attended "The Best of 88" software awards luncheon. The majority of the software programs designed for undergraduate education in liberal arts subjects came from the natural sciences and mathematics and statistics; other subject areas included social sciences, humanities, and English composition.
- o The Smoky Mountain Seminar on College Teaching and Learning brought together a group of university administrators and campus policy makers to develop projects, based on NCRIPTAL material, could be used to improve some aspect of the teaching-learning process at their home institution. Seventy-five college teachers and administrators participated in the week-long session. Participants came from all over the country and represented all types of higher education institutions. Many of the individual participants were guided to and successfully developed high quality projects which promise to have an impact beyond their immediate campus and institution.
- o NCRIPTAL has developed a number of practical tools to help faculty improve their teaching: "Discussion Guide for Course Planning", "Writing Course Syllabi for Improved Communication", and an institutional self-assessment guide on academic management practices. The book on Classroom Assessment Techniques will assist faculty efforts to improve the quality of the educational experience for undergraduates.
- o The Center developed and conducted a national survey of University faculty to identify the factors that motivate faculty in their roles as teachers and scholars. Another survey of 181 University presidents and other top academic officials is also nearly completed. This simultaneous faculty and administrator study is the first of its kind;

the goal is to identify and help overcome institutional and organizational obstacles to effective undergraduate teaching and learning.

- o The Center developed the Motivated Strategies for Learning Questionnaire. This instrument has been administered to over 800 students at three different institutions. This instrument is being designed to provide students with immediate diagnostic feedback that strengthens their learning strategies, motivation, and problem solving techniques.

Publications

Books and Articles

Stark, Joan S., and Lisa A. Mets, 1988. Improving Teaching and Learning Through Research. New Directions for Institutional Research No. 57. San Francisco: Jossey-Bass.

Kozma, Robert, Jerome Johnston, and Robert Bangert-Downs, 1987. "EDUCOM/NCRIPTAL Higher Education Software Awards." Academic Computing 2(2):36-41.

Kozma, Robert B., Robert Bangert-Downs, and Jerome Johnston, 1987. "Rewarding Innovation: 1987 EDUCOM/NCRIPTAL Higher Education Software Awards." EDUCOM Bulletin 22 (3):18-26.

"The National Center for Research to Improve Postsecondary Teaching and Learning." 1987. Pp. 125-154 in ASHE Handbook on Teaching and Instructional Resources, edited by John J. Gardiner. Washington, DC: Association for the Study of Higher Education.

Naveh-Benjamin, Moshe, Wilbert J. McKeachie, Yi-Guang Lin, and David G. Tucker, 1987. "Inferring Students' Cognitive Structures and Their Development Using the 'Ordered Tree Technique'." Journal of Educational Psychology 78(2):130-140.

Pintrich, Paul R., 1988. "Student Learning and College Commitments," edited by R. E. Young and Kenneth E. Eble. New Directions for Teaching and Learning No. 33. San Francisco: Jossey-Bass.

Pintrich, Paul R., (forthcoming). "The Dynamic Interplay of Student Motivation and Cognition in the College Classroom." In Advances in Motivation and Achievement, vol. 6, edited by M. Maehr and C. Ames. Greenwich, CT: JAI Press.

Center Publications

- Alexander, Joanne M., and Joan S. Stark, 1986. Focusing on Student Academic Outcomes: A Working Paper. Ann Arbor, MI. Technical Report No. 86-A-002.0.
- Blackburn, Robert T., Janet H. Lawrence, Steven Ross, Virginia Polk Okoloko, Jeffery P. Bieber, Rosalie Meiland, and Terry Street, 1986. Faculty as a Key Resource: A Review of the Research Literature. Ann Arbor, MI. Technical Report No. 86-D-001.0.
- Blackburn, Robert T., and Judith A. Pitney, 1988. Performance Appraisal for Faculty: Implications for Higher Education. Ann Arbor, MI. Technical Report No. 88-D-002.0.
- Cross, K. Patricia, and Thomas A. Angelo. 1988. Classroom Assessment Techniques: A Handbook for Faculty. Ann Arbor, MI. Technical Report No. 88-A-004.0.
- Directory of Software Submitted for the 1988 EDUCOM/NCRIPTAL Higher Education Software Awards. 1988. Ann Arbor, MI. Technical Report No. 88-F-012.
- Directory of Software Submitted for the 1987 EDUCOM/NCRIPTAL Higher Education Software Awards. 1987. Ann Arbor, MI. Technical Report No. 87-F-004.
- Green, Patricia J., and Gerald M. Gurin, and Kathleen M. Shaw, (forthcoming). Success for the Underprepared: Linking Student Characteristics and Academic Programs. Ann Arbor, MI. Technical Report 88-A-001.0.
- Green, Patricia J., and Joan S. Stark, 1986. Approaches to Research on the Improvement of Postsecondary Teaching and Learning: A Working Paper. Ann Arbor, MI. Technical Report 86-A-001.0.
- Johnston, Jerome, 1986. Electronic Information: Literacy Skills for a Computer Age. Ann Arbor, MI. Technical Report No. 86-F-001.0.
- Johnston, Jerome, and Susan Gardner, 1988. The Best of '88 (including The Best of '87). Ann Arbor, MI. Videotape No. 88-F-013.
- Johnston, Jerome, and Susan Gardner, 1987. The Electronic Classroom in Higher Education. Ann Arbor, MI. Videotape No. 87-F-009.

- Johnston, Jerome, and Susan Gardner, 1987. The Electronic Classroom at the University of Michigan. Ann Arbor, MI. Videotape No. 87-F-006.
- Johnson, Jerome, and Susan Gardner, 1987. The Electronic Classroom in the Regional Teaching University. Ann Arbor, MI. Videotape No. 87-F-007.
- Johnston, Jerome, and Susan Gardner, 1987. The Electronic Classroom in the Community College. Ann Arbor, MI. Videotape No. 87-F-008.
- Korn, Harold A., 1986. Psychological Models of the Impact of College on Students. Ann Arbor, MI. Technical Report No. 86-B-002.0.
- Kozma, Robert, and Robert Bangert-Drowns, 1987. Design in Context: A Conceptual Framework for the Computer Software in Higher Education. Ann Arbor, MI. Technical Report No. 87-F-002.0.
- Kozma, Robert B., Robert L. Bangert-Drowns, and Jerome Johnston, 1987. 1987 EDUCOM/NCRIPTAL Higher Education Software Awards. Ann Arbor, MI. Technical Report No. 87-F-003.0.
- Kozma, Robert B., Jerome Johnston, and Scott Sinder, 1988. 1988 EDUCOM/NCRIPTAL Higher Education Software Awards. Ann Arbor, MI. Technical Report No. 88-F-011.0.
- McKeachie, Wilbert J., Paul R. Pintrich, Yi-Guang Lin, and David A. F. Smith, 1986 (supplemented in 1987). Teaching and Learning in the College Classroom: A Review of the Research Literature. Ann Arbor, MI. Technical Report No. 86-B-001.0.
- Peterson, Marvin W., Kim S. Cameron, Lisa A. Mets, and Philip Jones, 1986. The Organizational Context for Teaching and Learning: A Review of the Research Literature. Ann Arbor, MI. Technical Report No. 86-E-001.0.
- Stark, Joan S., and Malcolm A. Lowther (with assistance from Sally Smith), 1986. Designing the Learning Plan: A Review of Research and Theory Related to College Curricula. Ann Arbor, MI. Technical Report No. 86-C-001.0.
- Stark, Joan S., Malcolm A. Lowther, Michael P. Ryan, Sally Smith Bomotti, Michele Genthon, and C. Lynne Haven, 1988. Reflections on Course Planning: Faculty and Students Consider Influences and Goals. Ann Arbor, MI. Technical Report No. 88-C-002.0.

Vogel, Carol D., and Joan S. Stark, 1986. Postsecondary Teaching and Learning Issues in Search of Researchers: A Working Paper.
Ann Arbor, MI: National Center for Research to Improve
Postsecondary Teaching and Learning Technical Report No. 86-A-003.0.

Publications may be requested by writing to:

National Center for Research to Improve Postsecondary Teaching
and Learning
2400 School of Education Building
The University of Michigan
Ann Arbor, Michigan 48109-1259

NATIONAL CENTER ON EDUCATION AND EMPLOYMENT

Teachers College
Columbia University
Box 174
New York, New York 10027
(212) 678-3091

Director: Sue E. Berryman

Associate Director for Research: Thomas K. Glennan, Jr.

Associate Director for Communication: Erwin Flaxman

Affiliated Institutions: The RAND Corporation and City
University of New York, Graduate
Center

Mission

The Center's research program seeks to improve the knowledge base for deciding who should teach what work-related skills to whom, when, how, and with what effects. Toward this objective it supports research by economists, cognitive psychologists, sociologists, anthropologists, historians, and policy analysts. The Center also has an active program to communicate this knowledge to those with a stake in or responsibilities for developing this nation's human capital: the business community, federal and state governments, the educational policy community, and the press.

Programs of Research

Principal Investigators

Changes in Skill Structure and Employment Processes	Thomas Bailey and Thierry Noyelle
Education and the Growth of the American Economy	Ann P. Bartel and Frank R. Lichtenberg
Cognitive Skills in the Workplace	Sylvia Scribner
Education and the Labor Market	Jacob Mincer and Joseph Altonji
Job Training and Labor Market Outcomes: Comparisons of the U.S., U.K., and Australia	Hong Tan
Mapping the Work-Related Education System: Data Needs	Thomas Glennan, Jr., and Jeannie Oakes

Community-Based Planning for
Work-Related Education:
Implications for Research and
Policy

Thomas Glennan, Jr.,
James Harvey, Anthony H.
Pascal, and Susan Brodilly

OERI Center Liaison: Nevzer Stacey
Office of Research
Higher Education and Adult Learning Division
(202) 357-6243

Major Research Findings

- o Increased international and domestic competition has created strong pressures on all levels of the production process to be more responsive to changes in tastes and demand--to "customized consumption". In both service and manufacturing industries the American economy is moving from a production-oriented to a product-oriented and customer-oriented world, from mass production to flexible production.
- o When production depends on "hard" automation, the retooling required to produce varied output is very costly. A "hard" technological regime drives toward long production runs that reduce per unit cost and toward the specialization of labor and routinization of jobs. As technologies become computer-based, they become "flexible" in that retooling simply requires reprogramming, thus allowing shorter production runs and more varied or customized production. Under a flexible production regime, the objective is to combine the customizing implicit in craft production with the cost savings of mass production. Flexibility has usually been achieved by moving back up the range of skill levels, shifting from specialized to general purpose tools and machines, and reorganizing how people get the work done. In other words, the spread of micro-electronics and related technologies does not just result in new machines that must be mastered, but in a much deeper change in the way production is organized and the ways that workers relate to the production process and to each other.
- o Economic changes create the demand, not just for new occupationally-specific skills, but also for cross-occupational skills that our elementary and secondary schools need to develop in all students.
- o Economic changes require **strong academic skills**. Perhaps the most profound educational implication of computers in the workplace is that they force a replacement of **observational learning** with **learning acquired primarily through symbols**, whether verbal or mathematical. An example

lies in a family of technological systems known as manufacturing resource planning (MRP), systems carrying much of the burden of positioning American industries to compete and consisting of a computer-based integrated information system that coordinates data about all aspects of a company's operations. What is important about the MRP and systems like it is that they are content-free, formal, closed conceptual systems that workers at all skill levels within the firm have to use. As such, they have many of the characteristics of "school" subjects, such as mathematics or grammar, and departs in significant ways from the traditional systems of knowledge that reflect accumulated managerial and production wisdom.

- o Economic changes demand **higher order cognitive thinking skills**. The shift from mass to flexible production and changes in the time frame for production combine to increase the need for higher-order cognitive thinking, even for jobs that we usually conceive of as lower skill. Time has become an important competitive weapon. Companies that can respond to product or service demand quickly gain a competitive edge. If the variation in product and service associated with flexible production multiplies the number of decisions that must be made, the time element makes it difficult to buck these decisions up and back down supervisory lines. Decisions are therefore necessarily having to be made more frequently on the shop floor and in back offices. Thus, employees in both higher and lower skill jobs are increasingly required to deal with uncertainty, the unfamiliar, and discontinuity. They have to understand the firm's market environment and the organizational context in which the job is embedded. There is a stunning parallel between the cognitive requirements of today's workplace and the defining characteristics of higher-order thinking.
- o Economic changes require the **ability to self-direct**. Economic forces are flattening out company hierarchies, eliminating supervisory and middle management positions. Supervisory functions are being increasingly delegated to the worker and/or to the team, requiring of previously-supervised workers, not only the ability to make the decisions previously delegated to supervisors, but also the ability to self-regulate or self-direct.
- o Economic changes require the **ability to know how to learn**. The volatility of markets produces a volatility in job tasks--from the job of claims adjuster in the insurance industry to that of operator in the textile mills. These changes imply the need to know how to learn--in other words, how to organize social and technological resources

to transform what is unfamiliar into the mastered. This process requires knowing how to identify the limits of one's own knowledge, how to ask germane questions, how to penetrate poor documentation, and how to identify sources of information. As Noyelle observes, "We are moving into an era in which the traditional separation between working and learning is disappearing, with learning becoming increasingly integrated into a person's work life."

- o Economic changes require **teamwork abilities**. Under mass production, employees, especially those in factory floor and "back office" jobs, often worked alone, albeit in physical proximity to each other. As job responsibilities broaden and increasingly intermesh, workers have to function collaboratively--and classic research in social psychology shows that individual competence does not generalize to team competence. For example, pilot error accounts for an increasing percent of fatal airline crashes worldwide, and many analyses have pinpointed poor team performance as an important component of that error.
- o Economic changes require **conflict resolution skills**. As the labor force becomes increasingly multicultural and job content changes rapidly and in confusing ways, communication problems also increase between workers, generating the need for interpersonal communication and conflict resolution skills. These problems self-evidently reduce productivity; more subtly, they interfere with an important social mechanism for learning on the job--peer help.
- o Most surveys of employers' skill requirements are methodologically seriously flawed. For example, responses will vary, depending on the respondent's position in the company. However, most of these surveys do not systematically sample respondents either from the same functional position in companies or, in an attempt to assess variation, across functional positions.
- o The employment share of professional and technical workers in the high technology sector is 2.5 times larger than it is in "other manufacturing". The rate of labor productivity grew 143 percent between 1960 and 1980 in the high technology sector as opposed to the rest of manufacturing, which grew 60 percent between 1960 and 1980. Highly educated labor is used more intensively in the "young" high technology industries than in the "mature" non-high technology industries. In other words, the U.S. comparative advantage in high technology projects is based to an important extent on the U.S. being relatively well endowed with highly educated workers.

- o High technology industries are high wage industries because the introduction of new technologies increases the relative numbers of better educated and accordingly higher-wage workers. Technological change increases the relative wages of college graduates, but skill obsolescence in rapidly changing fields may act to reduce the average earning capacity of older relative to younger college graduates.
- o Analyses do not support common fears of "technological unemployment." On average, in the longer run, technological change **reduces unemployment**; in the shorter run, it **does not increase unemployment**.
- o In response to technological innovation, employers first hire people with more education: education provides general human capital that equips people to cope with change more effectively. As new technologies become routinized, firms expand in-house training and hire fewer well-educated, and expensive, workers. In the early stages of technological innovation in industries, wages grow faster in these than in lower-productivity-growth industries for the better-educated, but not for the less-educated. However, as the technology matures, training increases, employers increase wages to retain trainees, and wages in high-productivity-growth sectors grow faster than in lower-productivity-growth industries even for the less educated.
- o Company-sponsored training is complementary to, not a substitute for, investments in basic skills. Employers train their best-educated employees: between 1967 and 1980 only 45 percent of those who failed to complete high school but 71 percent of high school completers and 79 percent of college graduates receive training from their employers. Employees who are trained in one job are also more likely than other new employees to be trained in subsequent jobs. Employer training, therefore, accentuates differences in basic education attainment and achievement among employees--differences that account for most of the differences in income among workers.
- o Employer-sponsored training produces higher wages, greater increases in productivity, and smaller chances of unemployment than formal classroom training. However, employer training reinforces rather than reduces the differences in educational attainment among new employees. Well-educated people are the most likely to find employment and to receive training from their employers. Once trained, their greater productivity earns them more, they switch jobs less frequently, and they are rarely unemployed. If they change jobs, they find another more

easily and are more likely to receive further training from their new employers. Those that start their careers lacking basic skills fall further and further behind.

- o The rate of return from education declined during the 1970s as the large and well-educated baby boom entered the labor market. Earnings of college graduates (during their first five years in the labor market) declined from 150 percent of similarly-experienced high school graduates in 1965 to only 130 percent in 1979. But that trend reversed dramatically during the 1980s. By 1986, competition among employers seeking well-educated employees drove up relative earnings of college graduates to 180 percent of those of high school graduates.
- o Wage profiles and rates of labor turnover in Japan and the United States reflect the commitment of Japanese managers and workers to on-the-job training within the firm. After intensive selection during recruitment, workers hired in rapidly growing Japanese industries will be continuously retrained, will share in high wage growth, and will often have the opportunity for reassignment within the firm should their skills be bypassed too quickly by changing technology and knowledge in their field. Thus, high wages and low turnover are linked in Japanese practice.
- o Workers who receive employer-sponsored training are less likely to leave the company that trained them; workers who move less are more likely to receive training from their employers; and workers who exhibited prior mobility exhibit less mobility once they receive training. Trained workers also change jobs within their company less often than untrained workers.
- o Training, not job switching, is the quickest way to increase earnings. For the average employee, less than 15 percent of real wage gains over time results from changing jobs; 85 percent comes from being paid more for being more productive.
- o Workers who have higher levels of education than the average levels in their occupations have higher rates of firm and occupational mobility than other workers with similar characteristics. When they move, they are more likely to move to occupations whose workers have higher average levels of education.
- o Virtually all labor market outcome measures, including wages, job turnover, unemployment and work hours and wage growth, are correlated between parents and children.

- o Intensive interviews with successful individuals who come from disadvantaged families indicate that education is a critical equalizer between this group and those from advantaged family backgrounds, especially for disadvantaged women. These interviews also support current premises about mentoring. Although asked no specific question about teachers, 65 percent of these success "surprises" spontaneously mentioned, several decades after their high school graduation, the positive influence that teachers had had in their education and in their lives.
- o In the workplace, teaching and learning are integrated into and subordinated to the functional requirements of the work process. "Learning to do" and "doing" occur concurrently at work; rarely is this the case at school.
- o Demographic changes mean that a growing share of the new skills needed in industry will have to be met by retraining existing workers. Since employers have traditionally met their increased needs for human capital by hiring recently educated individuals, this demographic change will pressure employers and postsecondary institutions to attend more systematically to the training needs of the experienced labor force.
- o The growing demand for skills, employers' reliance on well-educated workers to integrate new technologies into the firm, and the country's demography raise the prospect that economic growth will be constrained by a lack of well-educated and trained employees. More ominously, a dual labor market is evolving. The market for unskilled labor offers shrinking opportunities and rising poverty, while the market for human capital promises rising incomes and expanding choices. The challenge to the education system is to increase the human capital of all of its clients, but especially of those outside of the economic mainstream.

Selected Accomplishments

- o Center staff have prepared or helped others prepare several special background papers. These include a Special Article for the Bulletin, the journal of the National Association of Secondary School Principals; a special background paper for the leadership of the National Education Association; a synthesis paper on education and the economy for the Aspen Seminar on the Federal Role in Education, sponsored by the Carnegie Corporation, Ford Foundation, Hewlett Foundation, Primerica Foundation, and Rockefeller Brothers

Foundation; and a special paper for a Rockefeller Foundation conference on the implications of economic changes for training disadvantaged women. The staff gave substantial technical advice to the National Alliance of Business, which functioned as staff for the "Building a Quality Workforce Initiative". This project, funded by the U.S. Departments of Education, Labor, and Commerce, culminated in a small July 1988 conference chaired by the Secretaries of Education, Labor, and Commerce. The Roundtable on Workforce Literacy, sponsored by the Education Commission of the States and the Sears-Roebuck Foundation, used Center work as background material provided participants and included Center staff among its participants.

- o Center staff held special briefings for government policymakers. For example, we briefed Jack Jennings, Chief Counsel to the House Education and Labor Committee, and three of his staff members on research of interest to them for the reauthorization of the Vocational Education Act. We briefed a newly created team from the Governor's Office, State of New York, on retraining the experienced labor force. We briefed a team from the General Accounting Office on the implications of our research for rethinking federal training programs.
- o Center staff have given a large number of speeches to members of the business, federal and state governmental, and educational communities. These included a Policy Forum speech for staff members of the U.S. House of Representatives and the U.S. Senate; an address to the closed annual meeting of the Council of Chief State School Officers; a presentation at the annual meeting of the Education Commission of the States; presentations at two special Education Writers Association conferences; an address to a Conference Board conference; addresses to the American Association of School Administrators, the American Society for Training and Development, Jobs for the Future, the American Federation of Teachers, National Council for Employment Policy, Southern Education Foundation, and the Southern Growth Policies Board. The staff held an American Educational Research Association symposium on the Center's work.
- o Center staff have given numerous research presentations to their professional colleagues in the United States and Europe. These include presentations at the Eastern Psychological Association; American Anthropology Association; Center for Educational Research and Innovation; Association for Public Policy Analysis and Management; National Bureau of Economic Research Summer Institute; Princeton University, Department of Economics; University of Michigan, Department of Economics;

Rockefeller Institute of Government; University of Minnesota, Economics Department; Columbia University, Economics Department; Northwestern University, Department of Economics; Cornell University, Department of Economics; Econometric Society, Tokyo, Japan; Organization for Economic Cooperation and Development, Paris, France; Free University, Berlin; University of Lille, France; Nordic Society for Educational Research, Reykjavik, Iceland; and Swedish Employer Federation, Stockholm, Sweden.

- o The Center director, as a member of **tasks forces and advisory boards**, has been able to use the Center's research to frame and inform the discussions of these bodies. They include the Advisory Panel for the National Assessment of Vocational Education; the New York State Task Force on Implementing Educational Reform; the National Panel on Youth and America's Youth, chaired by Willard Wirtz and John T. Dunlop; and two National Academy of Science Panels, one on the National Science Foundation data bases for scientific and engineering personnel and the other on issues of scientific labor supply and demand.
- o The Center has provided reports, information, or referrals to literally thousands of individuals and organizations--for example, the Lilly Endowment, Indianapolis, IN; Ball Corporation, Chicago, IL; IBM Corporation, Rockville, MD; Foundation for the Advancement in Science & Education, Los Angeles, CA; AFL-CIO, Washington, DC; Boston Globe, Boston, MA; Newsweek Magazine; National Center for Fair and Open Testing; AETNA Institute for Corporate Education; Exxon Education Foundation; The Carnegie Forum on Education and the Economy; Mobil Foundation; Xerox Foundation; the American Council on Education; American Association for Adult and Continuing Education; the Chamber of Commerce of the United States; the E. McConnell Clark Foundation; and Research for Better Schools.
- o Center work has appeared in a number of **popular press and educational publications as well as electronic media**: Education Week; Phi Delta Kappan; Insight magazine; radio station WOR-TV, New York; and The Johnson Foundation Wingspread radio; and newspapers, such as the Oakland Tribune. Center staff have helped journalists, magazine writers, and television program producers frame their articles or documentaries--for example, Edward Fiske of the New York Times; producers of a special MacNeil-Lehrer program on education; ABC Evening News; and a special ABC 20/20 documentary. In part because of these connections, the Center director was invited to participate in Fortune Magazine's Education Summit conference last fall.

- o Center research findings were published in four editorials by national newspapers this last year. Two editorials by Albert Shanker appeared in The New York Times, entitled "Rethinking Failure and Success...And the School -Student Connection" and "A Cloudy Future for Jobs: Education Still Clear Choice." William Raspberry wrote in the Washington Post: "The Jobs Are There - Why Can't Our Kids Do Them?" and "Kids Whose Goals Are Too Modest." As a result of this press coverage, approximately another 1,000 copies of Center publications have been sent on demand or as part of special mailings.

Publications

Books and Articles

- Berryman, Sue E. 1988. "Education and the Economy: A Diagnostic Review and Implications for the Federal Role." Paper prepared for the Seminar on the Federal Role in Education, The Aspen Institute, Aspen, Colorado.*
- Berryman, Sue E. 1988. "Institutional Partnerships for Human Resource Adjustment." Paper prepared for the Organization of Economic Co-operation and Development (OECD), Rural Policy Implementation, Athens, Greece.*
- Berryman, Sue E. 1988. Who Serves? The Persistent Myth of the Underclass Army. London: Westview Press.
- Berryman, Sue E. 1986. "Are Youth and Educational Institutions Responsive to Technologically and Trade-generated Changes in Skill Requirements?" The Internationalization of the U.S. Economy: Its Labor Market Policy Implications. Conference Proceedings of the National Council on Employment Policy, Washington.
- Bailey, Thomas. 1989. "Changes in the Nature and Structure of Work: Implications for Employer-Sponsored Training." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*
- Bailey, Thomas. 1988. "Market Forces and Private Sector Processes in Government Policy: The Job Training Partnership Act." Journal of Policy Analysis and Management 7:300-315.
- Bailey, Thomas. 1987. "Employment and Training Programs." In Setting Municipal Priorities, 1988, edited by Charles Brecher and Raymond D. Horton. New York: New York University Press.

- Bartel, Ann P. 1989. "Utilizing Corporate Survey Data to Study Investments in Employee Training and Development." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*
- Bartel, Ann and Frank Lichtenberg. 1987. "The Skill Distribution and Competitive Trade Advantage of High-Technology Industries." Advances in Industrial and Labor Relations, 4:161-176.
- Mincer, Jacob. 1989. "Labor Market Effects of Human Capital and of Its Adjustment to Technological Change." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*
- Noyelle, Thierry. 1989. "Skills, Skill Formation, Productivity and Competitiveness: A Cross-National Comparison of Banks and Insurance Carriers in Five Advanced Economies." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*
- Noyelle, Thierry. 1987. "A New Economic Order: New Challenges, Fresh Solutions." Forum for Applied Research and Public Policy 2:97-105.
- Noyelle, Thierry. 1987. Beyond Industrial Dualism: Market and Job Segmentation in the New Economy. Boulder: Westview Press.
- Noyelle, Thierry. 1987. "The New Technology and the New Economy: Some Implications for Equal Employment Opportunity." In Computer Chips and Paper Clips-Technology and Women's Employment: Case Studies and Policy Perspectives, edited by Heidi I. Hartmann. Washington: National Academy Press, 2:373-393.
- Noyelle, Thierry. 1987. "Services and the New Economy: Towards a New Labor Market Segmentation." Paper prepared for the seminar on Dynamique des Services et Theories Economiques. I.F.R.E.S.I. and Center European John Hopkins, Lille, France.
- Noyelle, Thierry. 1987. "Unemployment, Underemployment and Labor Market Distress: A View From the United States." Paper prepared for a Symposium on Employment and Training Policy:

Coping with the Changing Structure of Unemployment. National Institute of Employment and Vocational Research, Tokyo, Japan.

Noyelle, Thierry. 1986. "Economic Transformation." In Revitalizing the Industrial City, The Annals of the American Academy of Political and Social Sciences, edited by Marvin E. Wolfgang and Ralph R. Widner. Newbury Park, Sage Publications 488:9-17.

Noyelle, Thierry and Olivier Bertrand. 1988. "Employment and Skills in Financial Services: A Comparison of Banks and Insurance Companies in Five Countries." Journal of Service Industries, 8:14-24.

Tan, Hong. 1989. "Private Sector Training in the United States: Who Gets It and Why." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*

Vaughan, Roger J. 1989. "Public Subsidies and Private Training." Paper prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*

Vaughan, Roger J. and Sue E. Berryman. 1989. "Employer-Sponsored Training: Current Status, Future Possibilities." Synthesis of findings from papers prepared for the Conference on Employer-Sponsored Training, Alexandria, VA., December 1-2, 1988, sponsored by the Institute on Education and the Economy, Teachers College, Columbia University, and the National Assessment of Vocational Education.*

* Papers with asterisks are available for \$5.00 from the National Center on Education and Employment, Teachers College, Box 174, Columbia University, New York, New York, 10027. Papers without asterisks are available from their publishers.

Center Publications

Occasional Paper Series

Berryman, Sue E. March, 1987. Shadows in the Wings: The Next Educational Reform.

Berryman, Sue E. July, 1987. Breaking Out of the Circle: thinking Our Assumptions About Education and the Economy.

Scribner, Sylvia. April, 1988. Head and Hand: An Action Approach to Thinking.

Berryman, Sue E. April, 1988. Education and the Economy: What Should We Teach? When? How? To Whom?

Noyelle, Thierry. April, 1988. Services and the New Economy: Toward a New Labor Market Segmentation.

Mincer, Jacob and Yoshio Higuchi. June, 1986. Wage Structures and Labor Turnover in the U.S. and in Japan.

Natriello, Gary. April, 1988. What Do Employers Want in Entry-Level Workers? An Assessment of the Evidence.

Technical Paper Series

Bailey, Thomas, and Thierry Noyelle. April, 1988. New Technology and Skill Formation: Issues and Hypotheses.

Bailey, Thomas. April, 1988. Education and the Transformation of Markets and Technology in the Textile Industry.

Sicherman, Nachum. December, 1988. "Over-Education" in the Labor Market.

Sicherman, Nachum. December, 1988. Education and Occupational Mobility.

Scribner, Sylvia. December, 1988. Experimental Studies on the Relationship of School Math and Work Math.

Mincer, Jacob. December, 1988. Education and Unemployment.

Digests

Bailey, Thomas and Thierry Noyelle. The Impact of New Technology of Skills and Skill Formation in the Banking and Textile Industries.

Natriello, Gary. Do We Know What Employers Want in Entry-Level Workers?

Harrington, Charles and Susan K. Boardman. Paths to Unusual Success.

In Press

Altonji, Joseph. "The Effects of Family Background and School Characteristics on Education and Labor Market Outcomes."

Altonji, Joseph. "The Effects of High School Curriculum on Education and Labor Market Outcomes."

Altonji, Joseph. "Estimating the Returns to Education, Controlling for Personal, School, and Community Characteristics."

Altonji, Joseph. "Estimating the Returns to Education, Taking Account of Uncertain Educational Outcomes."

Bailey, Thomas. "Technology, Skills, and Education in the Apparel Industry."

Altonji, Joseph. "Changes in the Nature and Structure of Work: Implications for Skills and Skill Formation."

Bartel, Ann P. and Frank J. Lichtenberg. "Technological Change and the Interindustry Wage Structure."

Bodilly, Sue and David Menefee-Liby. "Mapping the Pittsburgh Work-Related Education System."

Glennan, Thomas K., Jr. "Community-Based Strategic Planning for Work-Related Education."

Glennan, Thomas K., Jr., and Jeannie Oakes. "Mapping the Work-Related Education System: Policy Issues and Data Needs."

Mincer, Jacob. "Human Capital Responses to Technological Change in the Labor Market."

Pascal, Anthony. "Alternative Futures for the Greater Pittsburgh Economy."

All Center Publications are available from the National Center on Education and Employment, Teachers College, Box 174, Columbia University, New York, New York, 10027. Costs for publications are as follows: Occasional Papers, \$2.00; Technical Papers, \$5.00; and Digest, Free.

Section I I

READING RESEARCH AND EDUCATION CENTER

University of Illinois
174 Children's Research Center
51 Gerty Drive
Champaign, Illinois 61820
(217) 333-2552

Co-Directors: Richard C. Anderson
P. David Pearson

Associate Director: Jean Osborn

Sub-Contractor: Bolt, Beranek and Newman, Inc.

Mission

The primary mission of the Reading Research and Education Center is to conduct basic and applied research and to engage in practical programs that will produce a better understanding of the fundamental nature of the reading process, of how children learn to read, and of the role reading plays in the acquisition of knowledge in the humanities, social sciences, and natural sciences. For example, the Center seeks to understand important aspects of emergent literacy and the higher forms of literacy that entail the disciplined, planful use of the mind.

Examples of continuing programs of basic research at the Center include (1) perceptual processes in reading, (2) how metaphors and analogies are comprehended and the roles they may play in acquiring new knowledge, (3) the interplay between children's reading and their acquisition of scientific knowledge, (4) the representation and application of knowledge acquisition in the content areas, and (5) the structure of narrative and expository prose.

Examples of active programs of applied research include (1) the description and evaluation of instructional practices in elementary and middle school reading classes, (2) the analysis of reading and content area textbooks, (3) the development and validation of improved techniques for teaching reading, (4) the use of computer technology in innovative instructional programs, and (5) the training of teachers and students in the use of "framing" study techniques.

Examples of practical actions include (1) conducting teacher training institutes, (2) writing and distributing syntheses of research for teachers and other educators, (3) preparing and distributing pamphlets (in Spanish as well as English) about reading for parents, and (4) creating a radio documentary on

literacy, and (5) developing guides for teachers to use when evaluating reading programs.

Programs of Research

Principal Investigators

Acquisition of Knowledge and
Skills Dedre Gentner

Patricia Edwards

Jana Mason
George McConkie
Linda Meyer
Stella Vosniadou
David Zola

Instruction in Reading

Marilyn Adams
Richard C. Anderson
Bertram Bruce
Dolores Durkin
John Frederickson
Georgia Garcia
Violet Harris
Paul Horwitz
C. Liebling
William Nagy
Jean Osborn
A. Rosebery
Andee Rubin
Beth Warren
Phyllis Wilken

Text Characteristics

Thomas Anderson
Bonnie Armbruster
William Brewer
James Levin
Rand Spiro

Testing of Reading Proficiency
and Evaluation of Instruction

David Pearson
Diane Stephens

OERI Center Liaison: Anne P. Sweet
Office of Research
Learning and Instruction Division
(202) 357-6032

Major Research Findings

- o Studies of the effects of in-school and out-of-school independent reading on reading achievement found that the amount of time children spend reading books is significantly associated with several measures of reading ability in the fifth grade and that among all

the ways children spend their time, is the best predictor of growth in reading ability.

- o Investigations of basal reading program teachers' manuals, student readers, workbooks, content area textbooks, and the effects of the use of readability formulas on both the writing and comprehensibility of the content of student textbooks established the need for what has been termed "considerate" text. It also identified problems created for students by inconsiderate texts as well as some of the sources of the inconsiderateness.
- o Research on emergent literacy led to the development of effective guidelines for helping academically at-risk children. Procedures developed for use in kindergarten and head start classrooms include the teaching of sight words, text-reading, and writing as well as emphasizing phonological awareness, letter-sounds, and synthetic phonics. The research established the importance of reading-to-children activities that support both listening and reading comprehension.
- o Work on reading assessment conducted as part of a collaborative effort with the Illinois State Board of Education led to the development of prototypes of new strategies and item formats for comprehension assessment that reflect current views of the reading process.
- o Another collaborative effort with a public school system led to the training of 20 elementary school teachers to teach their students conceptual mapping techniques, that is to make graphic representations of the main ideas and the relationships of the other ideas in their social studies and science textbooks. Preliminary results indicate improved student learning.
- o Vocabulary research that included an analysis of the vocabulary of printed school English permitted, with greater precision than ever before, the determination of the number and types of words that children encounter in their school reading. Experimental studies of children's incidental learning of word meanings from written context enabled the researchers to determine how much word learning actually occurs during normal reading and provided information about which properties of words and text most strongly influence word learning.
- o Basic eye movement research deepened the understanding of the physiological and psychological underpinnings of the reading process. The research advanced current

knowledge about how both skilled and developing readers perceive text from moment to moment as they read and suggests that children use different strategies in their reading. It also studied the use of sophisticated computer-aided reading systems that help both children and adults make quantifiable improvements in their reading ability.

- o Classroom research focusing on both oral and written language use and the role of new technologies such as word processors, data bases, and electronic networks in reading and writing provided information about how and why teachers change the way they teach reading and writing and led to new methods for improving students' reading, writing, and thinking skills both with and without the use of new technologies.
- o A theory was developed and tested of learning, instruction, and knowledge representation for complex and ill-structured domains. Of special concern was the development of the kind of cognitive flexibility necessary for acquired knowledge to transfer to new situations.
- o Basic and applied research on awareness of thought processes and how these processes can be controlled permitted the testing and refinement of hypotheses attempting to explain the metacognitive strategies skilled readers use as they read. Findings from the research in the form of reciprocal teaching strategies have been applied successfully in classrooms where low-achieving middle and high school students have dramatically improved their ability to understand what they read.
- o A longitudinal study examining the sociological and psychological factors that, over time, can influence a student's acquisition of reading skill led to the development of new observation and testing techniques, the construction of a causal model to account for the operative factors that influence how, why, and how well children learn to read, and documentation not only of the family's important role in the learning process, but also of those elements of classroom instruction that most effectively foster the acquisition of reading skill.

Selected Accomplishments

- o "The Longitudinal Study of Developmental Literacy" has produced data that are being used to produce causal models to study the relationship between early reading

instruction and learning from content area texts as well as other issues related to content area reading.

- o "Explicit Comprehension Instruction: A Review of Research and a New Conceptualization of Instruction," a paper that synthesizes recent research about comprehension instruction, provides a historical perspective on classroom instruction of comprehension and formulates concepts about explicit comprehension instruction based on the most important studies of the last five or six years.
- o "Improving the Textbook Selecting Process: Case Studies of the Textbook Adoption Guidelines Project" documents the effectiveness of a series of booklets entitled "A Guide to Selecting Basal Reading Programs," which is being developed for the purpose of helping textbook adoption committees to evaluate basal textbooks. "
- o "10 Ways to Help Your Children Become Better Readers" is a brochure that was developed through OERI's cooperative agreement with the University of Illinois at Urbana-Champaign for the RREC. The brochure is available in both English and Spanish versions, and several thousand copies have been distributed nationwide.
- o The Center produced the Report of the National Commission on Reading, "Becoming a Nation of Readers." More than 200,000 copies of this book have been purchased by teachers and other educators, and it has been used by many school districts and state departments of education as the basis of training for teachers, school administrators, and members of the business community.
- o During the past five years, Center research has appeared in 288 articles in professional journals and popular magazines; 71 articles in the Reading Research Quarterly between 1975 and 1985 were by Center authors. Center research was cited 159 times in the Reading Research Quarterly in 1985 alone. During the past ten years, members of the Center staff have written or edited approximately 40 books. These books offer a wide range of topics, content, and style and are intended for a variety of audiences. (For a listing of recent articles and books by Center staff, see the Publications section.)
- o Center staff have appeared on the ABC World News Tonight, the CBS Evening News, and the NBC Today show, as well as dozens of local radio and television programs. Center research has been featured in the Reader's Digest and Time, and its work has been described in long, by-line articles in the Chicago Sun-Times, the

Chicago Tribune, the New York Times, the Boston Globe, the Los Angeles Times, the Hartford Courant, the Minnesota Tribune, and the Washington Post, as well as being mentioned more briefly in these and scores of other newspapers.

- o During the past five years, Center staff members have delivered addresses, presented papers, appeared as discussants and panelists, and led workshops and institutes for approximately 300,000 people, mostly teachers.

Publications

Books and Articles

- Anderson, R. C., E. H. Hiebert, J. A. Scott, and I. A. G. Wilkinson. 1985. Becoming a Nation of Readers. Urbana: University of Illinois, Center for the Study of Reading.
- Armbruster, B. B. and B. Gulbrandsen. 1986. "Reading Comprehension Instruction in Social Studies Programs." Reading Research Quarterly 21: 36-48.
- Durkin, D. 1986. "Are They Helping Teachers Teach Comprehension?" Reading Teacher 39: 410-17.
- Durkin, D. 1986. Teaching Them to Read (5th ed.). Newton, MA: Allyn & Bacon.
- Durkin, D. 1987. Teaching Young Children to Read (4th ed.). Newton, MA: Allyn & Bacon.
- Freebody, P. and R. C. Anderson. 1986. "Serial Position and Rated Importance in the Recall of Text." Discourse Processes 9:31-36.
- Green, G. M. 1988. Pragmatics and Natural Language Understanding. Hillsdale, NJ: Erlbaum.
- Green, G. and A. Davison. (in press). Critical Approaches to Readability: Theoretical Bases of Linguistic Complexity and Alternative Models. Hillsdale, NJ: Erlbaum.
- Groner, R., G. W. McConkie, and C. Menz. 1985. Eye Movements and Human Information Processing. Amsterdam: North Holland.
- Idol-Maestas, L. P. Paolucci-Whitcomb, and A. Nevin. 1986. Collaborative Consultation. Rockville, MD: Aspen Systems.

- Idol-Maestas, A. Nevin, and P. Paolucci-Whitcomb. 1986. Practices in Curriculum-based Assessment. Rockville, MD: Aspen Systems.
- Linn, R. L. 1988. Intelligence: Measurement, Theory, and Public Policy (Proceedings of a symposium in honor of Lloyd G. Humphreys). Champaign, IL: University of Illinois Press.
- Linn, R. L. (Ed.). (in press). Educational Measurement: Third Edition. New York: Macmillan Publishing Co.
- Mason, J. M. and K. Au. 1986. Reading Instruction for Today. Glenview, IL: Scott Foresman.
- Nagy, W. E. 1988. Teaching Vocabulary to Improve Reading Comprehension. Urbana, IL: ERIC/RCS, National Council of Teachers of English.
- Newman, D. and B. C. Bruce. "Interpretation and Manipulation in Human Plans." Discourse Processes.
- Ortony, A., G. L. Clore, and A. Collins. 1988. The Cognitive Foundations of Emotions. New York: Cambridge University Press.
- Underwood, N. R. and D. Zola. 1986. "The Span of Letter Recognition of Good and Poor Readers." Reading Research Quarterly 21: 6-19.
- Vosniadou, S. and A. Ortony. (eds.). (in press). Similarity and Analogical Reasoning.

Center Publications

Technical Reports

- Anderson, R. C. and A. Davison. October 1986. Conceptual and Empirical Bases of Readability Formulas. Technical Report No. 392.
- Anderson, R. C., I. Wilkinson, J. Mason, L. Shirey, and P. T. Wilson. January 1987. Do Errors on Classroom Reading Tasks Slow Growth in Reading? Technical Report No. 404.
- Anderson, R. C., P. T. Wilson, and L. G. Fielding. September 1986. Growth in Reading and How Children Spend Their Time Outside of School. Technical Report No. 389.
- Armbruster, B. B., T. H. Anderson, and J. Ostertag. November 1986. Does Text Structure/Summarization Instruction Facilitate Learning from Expository Text? November 1986. Technical Report No. 394.

- Blanchard, H. E. January 1987. The Effects of Pronoun Processing On Information Utilization During Fixations in Reading. Technical Report No. 405.
- Blanchard, H. E. November 1986. The Pattern of Utilization of Visual Information During Fixations in Reading. November 1986. Technical Report No. 395.
- Britton, J. April 1988. Writing and Reading in the Classroom. Technical Report No. 425.
- Collins, A., J. S. Brown, and S. E. Newman. January 1987. Cognitive Apprenticeship: Teaching the Craft of Reading, Writing, and Mathematics. Technical Report No. 403.
- Croll, V., L. Idol-Maestas, L. Heal, and P. D. Pearson. December 1986. Bridging the Comprehension Gap with Pictures. Technical Report No. 399.
- Dobson, L. January 1988. Connections in Learning to Write and Read: A Study of Children's Development through Kindergarten and Grade One. Technical Report No. 418.
- Durgunoglu, A. Y. November 1987. Limited Role of Contextual Information in Adult Word Recognition. Technical Report No. 411.
- Durkin, D. March 1988. A Classroom-Observation Study of Reading Instruction in Kindergarten. Technical Report No. 422.
- Durkin, D. January 1987. Testing in the Kindergarten. Technical Report No. 400.
- Ehri, L. C. September 1987. Movement in Word Reading and Spelling: How Spelling Contributes to Reading. Technical Report No. 408.
- Gaskins, I. W., M. A. Downer, R. C. Anderson, P. M. Cunningham, R. W. Gaskins, M. Schommer, and the Teachers of Benchmark School. April 1988. A Metacognitive Approach to Phonics: Using What You Know to Decode What You Don't Know. Technical Report No. 424.
- Goodman, B. A. December 1986. Reference and Reference Failures. Technical Report No. 398.
- Goodman, B. A. December 1986. Rule-Based Relaxation of Reference Identification Failures. Technical Report No. 396.
- Green, G. M. and M. S. Olsen. November 1986. Preferences for and Comprehension of Original and Readability-Adapted Materials. Technical Report No. 393.

- Greer, E. A. and J. M. Mason. February 1988. Effects of Home Literacy on Children's Recall. Technical Report No. 420.
- Idol, L. January 1987. A Critical Thinking Map to Improve Content Area Comprehension of Poor Readers. Technical Report No. 402.
- Kawakami-Arakaki, A. J., M. E. Oshiro, D. C. Farran. January 1988. Research to Practice: Integrating Reading and Writing in a Kindergarten Curriculum. Technical Report No. 415.
- King, M. L. January 1988. Speech to Writing: Children's Growth in Writing Potential. Technical Report No. 414.
- Liebling, C. R. December 1986. Inside View and Character Plans in Original Stories and Their Basal Reader Adaptations. Technical Report No. 397.
- Mason, J. M., C. L. Peterman, and B. M. Kerr. April 1988. Fostering Comprehension by Reading Books to Kindergarten Children. Technical Report No. 426.
- Mason, J. M., C. L. Peterman, B. Powell, and B. M. Kerr. January 1988. Reading and Writing Attempts by Kindergarten Children After Book Reading by Teachers. Technical Report No. 419.
- Meyer, L. A., E. A. Greer, and L. Crummey. May 1986. Are First Grade Basal Reading Programs Really All That Much Alike? An Analysis of the Labyrinth of Instructional Approaches to Decoding, Comprehension, and Story Text Comprehensibility in Four Programs. Technical Report No. 385.
- Meyer, L. A., E. A. Greer, and L. Crummey. May 1986. Elementary Science Textbooks: Their Contents, Text Characteristics, and Comprehensibility. Technical Report No. 386.
- McConkie, G. W., P. W. Kerr, M. D. Reddix, and D. Zola. February 1987. Eye Movement Control During Reading: I. The Location of Initial Eye Fixations on Words. Technical Report No. 406.
- McCormick, C. and J. M. Mason. September 1986. Use of Little Books at Home: A Minimal Intervention Strategy that Fosters Early Reading. Technical Report No. 388.
- McGinley, W. and R. J. Tierney. April 1988. Reading and Writing as Ways of Knowing and Learning. Technical Report No. 423.
- Nagy, W. and D. Gentner. December 1987. Semantic Constraints on Lexical Categories. Technical Report No. 413.

- Ohtsuke, K. and W. F. Brewer. May 1988. Discourse Organization in the Comprehension of Narrative Texts. Technical Report No. 428.
- Pearson, P. D. and J. A. Dole. May 1988. Explicit Comprehension Instruction: A Review of Research and a New Conceptualization of Instruction. Technical Report No. 427
- Phillips, L. M. September 1987. Inference Strategies in Reading Comprehension. Technical Report No. 410
- Pinnell, G. S. January 1988. Success of Children at Risk in a Program that Combines Writing and Reading. Technical Report No. 417.
- Raphael, T. E., C. S. Englert, and B. W. Kirschner. March 1988. Acquisition of Expository Writing Skills. Technical Report No. 421.
- Rosenblatt, L. M. January 1988. Writing and Reading: The Transactional Theory. Technical Report No. 416.
- Scha, R. J. H., B. C. Bruce, and L. Polanyi. October 1986. Discourse Understanding. Technical Report No. 391.
- Spiro, R.J., W. P. Vispoel, J. G. Schmitz, A. Samarapungavan, and A. E. Boeger. September 1987. Knowledge Acquisition for Application: Cognitive Flexibility and Transfer in Complex Content Domains. Technical Report No. 409.
- Teale, W. H. and M. G. Martinez. November 1987. Connecting Writing: Fostering Emergent Literacy in Kindergarten Children. Technical Report No. 412.
- Tenney, Y. J. June 1986. Predicting Reports of a Personal Event. Technical Report No. 387.
- Tyler, A. and W. Nagy. February 1987. The Acquisition of English Derivational Morphology. Technical Report No. 407.
- Vosniadou, S., P. D. Pearson, and T. Rogers. January 1987. What Causes Children's Failures to Detect Inconsistencies in Text? Representation vs. Comparison Difficulties. Technical Report No. 401.
- Wilkinson, I. A. G., J. L. Wardrop, and R. C. Anderson. October 1986. Reinterpreting Reading Instruction and Its Effects. Technical Report No. 390.

Reading Education Reports

Armbruster, B. B., T.H. Anderson, B. Cox, L. Friedman, B. F. Jones, S. Karlin, M. Kazarian, B. Martin, J. H. Osborn, and B. J. Walker. April 1986. The Collaboration to Improve Reading in the Content Areas (The Circa Project). Reading Education Report No. 65.

Davision, A. May 1986. Readability and Questions of Textbook Difficulty. Reading Education Report No. 66.

Davision, A. December 1986. Readability--The Situation Today. Reading Education Report No. 70.

Dole, J., T. Rogers, and J. Osborn. August 1986. Report of the Adoption Guidelines Project at the Center for the Study of Reading. Reading Education Report No. 68.

Osborn, J. September 1986. Reading Strategies and Reading Generalizations. Reading Education Report No. 69.

Tierney, R. J. and P. D. Pearson. June 1986. Schema Theory and Implications for Teaching Reading: A Conversation. Reading Education Report No. 67.

Valencia, S. and P. D. Pearson. December 1986. New Models for Reading Assessment. Reading Education Report No. 71

Wilson, P. T., R. C. Anderson, L. G. Fielding. September 1986. Children's Book Reading Habits: A New Criterion for Literacy. Reading Education Report No. 63.

Winograd, P. March 1986. Textbook Adoption in Kentucky. Reading Education Report No. 64.

Technical Reports and Reading Education Reports are available through the ERIC system. A limited number of reports that have not yet been assigned ERIC numbers are available through the Dissemination Manager of the Center, Room 174, 51 Gerty Drive, Champaign, IL 61820. Reports are \$3.00 each, postpaid. We must collect sales tax or be furnished with a tax exemption number for these states: Illinois (6-1/4%), Wisconsin (5%), Ohio (5%), Indiana (5%), and Michigan (4%). Checks or money orders are to be in U.S. funds only, payable to the University of Illinois.

Section I I

CENTER FOR RESEARCH AND DEVELOPMENT ON SCHOOL LEADERSHIP

College of Education
University of Illinois at Urbana-Champaign
Urbana, Illinois 61801
(217) 333-2870

Director: Russell Ames (Illinois)
University High School
1212 West Springfield Avenue
Urbana, Illinois 61801

Mission

The Center will investigate school leadership as it relates to school culture and climate and to teaching, learning and student achievement. Qualitative and quantitative methods will be used to address both the theory and practice of leadership and conferences and publications will be employed to tie research results to current practice. Scholarly papers, assessment instruments and comparative analyses will supplement the central research activities.

Programs of Research

Principal Investigator

Integration and Conceptualization

Russell Ames
Ellen Russell

School Leadership

Russell Ames
Martin Maehr
Alan Peshkin

School Culture and Climate

Martin Maehr
Larry Braskamp

School Leader Training and
Development Program

Russell Ames
Samuel Krug
Philip Kearney

School District Context for
Effective Leadership

Robert Crowson
Frederick Wirt
Allen Odden

OERI Center Liaison Ronald Anson
Office of Research
Schools and School Professionals Division
(202) 357-6213

Research Focus

For FY '89, research will be conducted under five programs, with the addition of a sixth program contemplated for FY '90. The research addresses the theoretical aspects of leadership, the practical aspects and ways of providing training in leadership skills to education professionals. These five programs and the projects which address these areas of research are described below.

Integration and Conceptualization - This program will include a synthesis of literature on the relation of school leadership to 1) school culture and climate, and 2) teaching, learning and student achievement. This synthesis, along with other information, will be presented at a 2 1/2 day conference in June, 1989 for researchers and practitioners on school leadership. The conference will address: 1) critical issues in study of instructional leadership; 2) alternative research perspectives; and 3) integration of all the Center's efforts to date.

A summary of the conference and other Center research, entitled "What Works in Effective School Leadership," will provide practical advice for school leaders. This document will be supplemented by two newsletters on school leadership prepared for national dissemination.

School Leadership - This program will be comprised of three major projects. The first is the Illinois School Leadership Program. In its first year the project will verify a model of the relationship among school leader behavior, school climate, and student learning. The project will refine assessment methodology of existing pilot study of an hierarchical sample of principals, teachers, and students. I will also further validate instructional leadership constructs through experience sampling study of 100-150 principals, linking constructs to observed behaviors.

The second project of the School Leadership Program is a Qualitative Study of School Leadership, School Culture, and District Culture. This will involve a re-analysis of three existing qualitative data sets on school leadership and school culture. I will look at student characteristics and school characteristics. As a basis for this reanalysis, the researchers will undertake a literature synthesis of school leadership and school culture, instructional leadership literature, and the Personnel Investment Theory of Maehr and Braskamp.

The third project under this program is a set of papers prepared by visiting scholars: William Boyd of Penn State University, who will focus on micropolitics and principals; Charles Kerchner of

Claremont Graduate School who will prepare analyses of data linking achievement to leadership and organizational variables, and; Douglas Mitchell of University of California at Riverside, work orientations of principals (administration, leadership, supervision and management) as they relate to school mission.

School Culture and Climate, the third program, includes two major studies. The first project is a Study of School Culture and Student Learning. In this study, data from 4000 10th grade students in Illinois will be analyzed to determine the relationship between organizational culture (along five dimensions -- Accomplishment, Power, Recognition, Affiliation, and Mission) and student motivation and achievement. Also considered will be the modifying effects of students' sociocultural background, age and family/peer expectations.

The second project is a Refinement of Assessment Procedures. This project will revise, expand and validate the scales used in the Study of School Culture and Student Learning described above, as well as the three projects described under the School Leadership Program above. The project will suggest improvements in the procedures, surveys and inventories used in the noted projects.

The fourth program is the School Leader Training and Development Program. This program will field two projects aimed at evaluating current leadership practices. The first project, Field Tested Evaluation of Prototypical Administrator Assessment, Training, and Development Program, will be pilot test administrator assessment instruments to evaluate the process and content of assessment. The second project, Synthesis and Evaluation of Current Approaches to Administrator Training and Development, will survey LEAD programs to compare and contrast them to the "Illinois" approach.

The fifth and final program in the initial year is School District Context for Effective Leadership. It is comprised of three projects. The first project is Superintendent-Principal Interaction and School Leadership. It will include a report on the utility of agency theory to describe superintendent-principal interactions and a report on observations of facilitative and constraining effects of superintendent-principal relations on achievement from 10 districts. The second project is Administrator Conflict Management and Achievement Results. It is a study of superintendent's conflict management skills and their relation to achievement. Causes of conflict will be identified and measured through conflict biographies of administrators in high and low conflict situations. The third project is a study by a Visiting Scholar. This will be a longitudinal study of strategies and behaviors of 5

superintendents as they try to restructure the curriculum, the school and improve teacher professionalism. Specifically, it will look at curriculum restructuring to emphasize student problem solving skills, develop teacher career ladders, school restructuring, collegial teacher-administrator interactions and use of instructional technology to improve productivity. It will also investigate the effects of community characteristics and state policies on these efforts and will try to link the various factors to student learning.

CENTER FOR RESEARCH ON THE CONTEXT OF SECONDARY SCHOOL TEACHING

School of Education
Stanford University
Cubberly Hall - Building 325
Stanford, California 94305
(415) 723-4972

Director: Milbrey W. McLaughlin

Associate Director: Joan E. Talbert

Affiliated Institution: Michigan State University

Mission

The "School Context" Center mission is to discover how working conditions and other circumstances in schools affect teachers, promote or hinder effective teaching, and, ultimately affect student outcomes. An important objective of the Center is to provide policymakers and practitioners with information about how school policies and practices, especially those associated with recent reforms, relate to the school context, teachers, and teaching.

Programs of Research

Core Research Project on
Secondary School Context

Unions as Context

Teacher Professionalism and
School Contexts

Professional Development and
Professional Community

The Academic Department

Sources of Departmental Leader-
ship and Authority

Subject Matter as Context for
Teaching and Learning

Content in Context, Content
as Context: The Case of English

Principal Investigators

M. W. McLaughlin and
J. E. Talbert

M. W. McLaughlin and
N. Bascia

R. Elmore and B. Rowan

J. W. Little

M. W. McLaughlin and
L. Siskin

D. Hill

S. Stodolsky

P. Grossman

Organizational Antecedents of
Teacher Commitment and
Teaching Practice

S. Raudenbush and
B. Rowan

Contingency Studies of Context and
Structure Effects on School
Teaching Conditions

J. Hannaway and
J. Talbert

Potentials for Assessing Classroom
Teaching Effects with NELS: 88
Items and Samples

R. Snow

Statistical Models for Student and
Teacher Outcomes in School Settings

D. Rogosa

OERI Center Liaison: Elizabeth J. Demarest
Office of Research
School and School Professionals Division
(202) 357-6207

Research Focus

The Center's research program combines two strategies: developing a core data base and conducting special, focused research projects that build upon and extend that core data base. Three interdependent data sets are being developed in the core research project: (1) qualitative field data from 16 high schools selected to represent important school context differences; (2) survey data for these high schools that include items from two major national surveys of high schools, High School and Beyond (HS&B and NELS:88); (3) national survey data from HS&B and NELS:88.

The goal of the core research project is to develop a comprehensive model of how school context and workplace conditions affect teachers, teaching and a range of student outcomes. The Center is especially interested in identifying and understanding those factors and conditions that influence teachers' and students' engagement in academic learning. In addition to context factors such as student characteristics, resources, district and state policies, the Center will examine the extent and ways in which departments and subject areas function as context for teaching.

Special projects supplement this comprehensive analysis of the secondary school context. These projects were selected to focus on particular, substantive or methodological issues that require special attention or that will be insufficiently examined as part of the core projects. They include research that inspects the

intersection of teacher, student and content in specific subject areas and aims to understand the ways in which "content is context", studies of the role of the academic department and the department's chair, and examination of the factors associated with teachers' sense of professionalism.

Parallel to these substantive research goals, the Center is pursuing activities that address the methodological challenges entailed in a research program on school context and in advancing techniques for integrating qualitative and quantitative, field-based and survey-based methods. The methodological goals of these efforts are to develop measures of teaching and learning that represent the significant differences associated with secondary education; to advance quantitative methods of multi-level modeling on school context and internal structural effects on teaching variables; to assess the utility of national longitudinal survey data for understanding teacher and context effects on a range of student outcomes; to conduct "bridging studies" that link quantitative and qualitative components of the research in ways that highlights the strengths and limitations of each strategy.

Publications may be obtained by writing to:

Center for Research on the Context of Secondary School Teaching
Stanford University - School of Education
CERAS Building
Stanford, California 94305

CENTER FOR RESEARCH ON THE EDUCATION OF DISADVANTAGED STUDENTS

School of Arts and Sciences
The Johns Hopkins University
3505 North Charles Street
Baltimore, Maryland 21218
(301) 338-7570

Director: Jomills H. Braddock II

Affiliated Institutions: University of California at Santa
Barbara; Northern Arizona University;
Teachers College, Columbia University;
and the Council of Chief State School
Officers

Mission:

The Center's mission is to significantly improve the education of disadvantaged students at each level of schooling through new knowledge and practices produced by thorough scientific study and evaluation. The Center's working definition of the "educationally disadvantaged" is students who are not succeeding or are under-achieving in school due to insufficient educational experiences in at least one of the three domains of school, family, and community. The strategy for carrying out the mission is to focus on the school as the major source of improvement in the education of the disadvantaged, to address the needs and interests of the educationally disadvantaged at all levels of development, to address the unique needs of language minority students, and to incorporate the family and the community into the school improvement effort.

Program of Research

Early and Elementary Education
Program

Middle Grades and High School
Program

Language Minority, Program

School, Family, and Community
Connections Program

Principal Investigators

Nancy Karweit
Robert Slavin

Joyce Epstein
Warren Hayman

Jane Duran
Alejandro Portes

Sandra Nettles

OERI Center Liaison: Ronald Pedone
Office of Research
Education and Society Division
(202) 357-6223

Research Focus

Early and Elementary Education Program

The primary goal of the Early and Elementary Education Program is to develop, evaluate, and ultimately disseminate instructional programs capable of bringing disadvantaged students to high levels of achievement, particularly in the fundamental areas of reading, writing, and mathematics. In particular, the goal of this program is to expand the range of effective alternatives which schools may use under Chapter 1 and other compensatory education funding and to study issues of direct relevance to federal, state, and local policy on education of disadvantaged students. By the end of the five-year funding period, Center staff expect to have identified effective early childhood programs, preventative reading programs, school-wide programs, classroom instructional programs, summer school and after school programs, family support and parent involvement programs, and intensive remedial programs capable of being used to ensure the success of all children.

Middle Grades and High School Program

Early adolescent students face personal dilemmas created by simultaneous and conflicting needs. For example, they need guidance from caring adults at the same time they need increasing independence and autonomy from adults. They need peer support and the comfort of conformity at the same time they need to develop unique and individual identities. The middle grades schools that serve these youngsters face dilemmas, as well. For example, these schools experience the simultaneous and often conflicting need to be responsive to student diversity, in order to allow individual growth and progress, but at the same time to provide challenging and common curricula to prepare all students for options in good high school programs.

The Middle Grades and High School Program will seek evidence on the effects of new organizational forms of schooling to resolve these dilemmas. These include alternatives to tracking and grouping practices that currently deflate disadvantaged students' self-image, alternatives to current evaluation and report card practices that currently punish poor students without recognizing or guiding improvement, alternatives to passive lecture and seatwork instructional approaches that currently bore and alienate students and suppress the joy and excitement of

learning, and alternatives to fixed time schedules for learning and testing that currently penalize students who need more time to learn and thus assure their failure.

The goal of the middle grades research program is to identify the components of this level of education that are especially important for disadvantaged early adolescents, that can be translated into practice, and that will predictably contribute to measurable "outcomes" of importance. For disadvantaged students, the important results of improved school and classroom organization are: higher rates of attendance, fewer retentions, more students on grade-level in reading, math, writing, science, social studies and foreign language, more students prepared for the academic programs in high school, more students with clear aspirations for high school and post-secondary education, more students with positive attitudes about themselves as students and about school as a place that helps them prepare for their future, and fewer dropouts in the middle grades and in high school.

The goal of the high school program is to pursue a plan of research and development that will result in more effective high schools for disadvantaged students. This area of research will include studies of effective dropout prevention programs, investigations of alternative school programs, research and development on specific approaches to boost student academic skills and to encourage students to respond positively to learning progress, evaluations of alternative approaches to create a close supportive social environment for "at risk" students, studies of high school programs that change the incentives for success in school, investigations of out-of-school influences on "at risk" youths, and research on specific high school effectiveness factors that can most help disadvantaged students.

Language Minority Program

The goal of the Language Minority Program is to investigate effective programs for disadvantaged Hispanic, American Indian, Southeast Asian, and other language minority children. The program's focus is on rigorous evaluations of practical, replicable programs which can increase the language skills of language minority children in their home language and in English and can accelerate the achievement of students in the traditional school subjects. Projects in the Language Minority Program will evaluate cooperative learning programs for Mexican-American and Indian students, community learning centers for Hispanic students, and extension of the Success for All Program to limited English proficiency Southeast Asian students. In addition, the Language Minority Program will investigate the causes of high school dropout among several immigrant groups.

Program on School, Family, and Community Connections

This program will focus on how teachers can form more productive partnerships with parents of disadvantaged students. The program will generate needed information about which parent involvement practices should continue and which should change across the grades, and how to inform and involve parents of disadvantaged students at all grade levels. The project will also develop useful teacher-training materials on effective parent involvement for teachers of disadvantaged students. The program will also study school and community connections. Here investigations will cover: (1) the different types of school and community connections that are designed especially to assist disadvantaged students, (2) the attitudes, situations and behaviors that promote or impede school and community efforts to implement viable and lasting programs, and (3) the effects of differently organized school and community partnerships on the learning and development of disadvantaged students.

Institutional Activities Program

The Institutional Activities Program will support four major projects. First, the center will establish a Research Partnership Network of Urban Schools. Members of the Network will provide center researchers with suggestions for critical issues to investigate and with feedback on research priorities and plans. Members will provide access to sites to conduct collaborative research. And members will participate in seminars to discuss current center work. Second, the center will work with the Council of Chief State School Officers to examine policy issues that affect schooling of the disadvantaged and to examine processes through which research findings can effectively reach and be useful to policy makers and education leaders. Third, the center will establish a National Minority Scholars Program that will support minority researchers both at the center and at other institutions. Fourth, the center will develop an Effective Programs Clearinghouse. This Clearinghouse will contain evaluations of programs for the disadvantaged that have been solicited from multiple sources -- especially evaluations that are not readily available to the general public.

CENTER FOR SCHOOL LEADERSHIP

Graduate School of Education
Harvard University
Monroe C. Guttman Library, Appian Way
Cambridge Mass. 02138-3704
(617) 495-3575

Director: Lee G. Bolman
Graduate School of Education
Monroe C. Guttman Library, Appian Way
Cambridge Mass. 02138-3704

Co-Director: Terrence E. Deal
George Peabody College of Education
Vanderbilt University
Nashville, Tenn. 37240

Affiliated Institutions: Vanderbilt University and University of
Chicago

Mission:

The Center's mission is to conduct research and development in the area of school leadership. The research agenda of the Center for School Leadership will focus on three major questions: 1) what is good leadership, 2) how does good leadership come about and 3) what will good leadership mean in the future. These questions will be addressed through a series of research projects by staff at Harvard University, Vanderbilt University and the University of Chicago.

Programs of Research

What is Good School Leadership?

How Does Good School Leadership
Come About?

What Will Good School Leadership
Mean in the Future?

Principal Investigators

Lee Bolman
Terrence Deal
Carol H. Weiss
Dan C. Lortie
Susan Moore Johnson

Lee Bolman
Terrence Deal
Catherine Marshall
Jerry Murphy

Willis Hawley
Phillip Hallinger

OERI Center Liaison: David Stevenson
Office of Research
Schools and School Professionals Division
(202) 357-6207

Research Focus

The research agenda of the Center for School Leadership will focus on three major questions: (1) what is good leadership, (2) how does good school leadership come about and (3) what will good school leadership mean in the future.

Since the Center is newly funded the research agenda is not fully established. Currently, however, several projects are under way. One project directed by Carol Weiss examines who assumes leadership functions in schools. Several functions will be examined including monitoring the environment for problems and opportunities, framing issues and assigning priorities, bringing in new information, making decisions, and constructing meanings that make sense of what the school has done and is doing.

Another project that is directed by Dan Lortie will examine the interaction of leadership and context through a detailed panel study of novice and 'new' principals. The framework of the study focuses on the ideational and relational aspects of leadership, on personal orientations to education and on key relationships involved in the achievement of goals stemming from that orientation.

A third study will focus on new superintendents and their effects on schools. This study directed by Susan Moore Johnson will examine how leadership is exercised from the central office and what kinds of initiatives have the greatest impact on school and classroom practices.

A fourth project will examine four different conceptual maps or frames of leadership and the relationship of principals' cognitive sets to their actions and to the ways that they interpret the consequences of their actions. This project will be carried out by Bolman and Deal.

Other proposed studies are studying the antecedents and outcomes of school leadership, the kinds and effects of current practices in leadership preparation, leadership in restructured schools, and access of women and minorities to leadership positions.

All of these projects are designed to help in identifying what is good school leadership and the conditions in which it is found.

CENTER FOR TECHNOLOGY IN EDUCATION

Bank Street College of Education
610 West 112th Street
New York, New York 10025
(212) 663-7200

DIRECTOR: Karen Sheingold

COLLABORATORS: Bolt Beranek & Newman Inc.
Brown University
Harvard University

Mission

The Center's mission is to conduct research and development leading to an understanding and demonstration of how technology can improve student achievement, and consequently school productivity.

Programs of Research

Design Experiments
Practices and Barriers Study
Teacher Understanding of
Technology Integration
Experimental Courses for Educators
Expert and Novice Representations
of Domain Knowledge
Intermedia

Multimedia Environments
Rochester Study
Home-school-community Studies
New Technologies for Mastery
Assessment in the Service of
Learning
Technology-Enhanced Domain Projects
and Portfolios
Assessment Research in Design
Experiments

Principal Investigators

A. Collins
K. Sheingold
M. Honey

C. Brunner
K. Spoehr

S. Gibbon and
N. Yankelovich

K. Wilson
K. Sheingold
S. Goldman
J. Fredriksen

H. Gardner

A. Collins

OERI Center Liaison: Doris Redfield
Office of Research
Learning and Instruction Division
(202) 357-6032

Research Focus

A general mandate of the Center for Technology in Education (CTE) is to conduct research on the teaching and learning of content, on school restructuring, and on the assessment of student learning. In keeping with the mandate, CTE will pursue three overall lines of research.

First, analyses of national patterns and issues will assess the current practices, opportunities and barriers with respect to particular issues of concern. For example, a major Practices and Barriers study is planned for year 1 (fiscal year 1989) that will address the integration of computers into school curricula. Studies 1, 2, 3, and 4 (listed above) will address issues concerning the knowledge and skills teachers need to use technology-based instructional strategies. Studies 1 and 2 will address the effects of interaction among teachers, students, and advanced technologies on students' learning of content. Studies 1, 2, 4, 5, 6, and 7 will address the design of instructional strategies that exploit potentials of advanced technologies.

Second, a program of "design experiments" will be carried out collaboratively with schools to design and study the optimal conditions for the integration of technology into schools under varying constraints. Studies 1, 2, and 4 will address the use of technology in the structuring of schools to maximize student achievement. Study 9 will address the viability of using technological advances to promote the development of home-based education that is meshed with school-based instruction. Study 7 will address the potential of instructional delivery systems that are technologically advanced to enhance the productivity of schools.

Third, research and development projects will be undertaken to advance the adaptation and incorporation of technologies not currently available to schools in ways that offer possibilities for more effective learning environments. Assessment plays a key role in this effort -- assessment that clearly emphasizes learning and thinking processes. Studies 10, 11, and 12 will focus on technologically enhanced assessment of study learning processes. Studies 1, 4, 10, 11, and 12 will address technologically enhanced assessment to inform classroom instruction. Finally, this line of research will consider the use of advanced technology to facilitate analysis of student achievement data to inform the administrative organization of instruction in content areas.

CENTER FOR THE LEARNING AND TEACHING OF ELEMENTARY SUBJECTS

Michigan State University
College of Education
Erickson Hall
East Lansing, Michigan 48824-1034
(517) 353-6471

Co-Directors: Jere Brophy (517) 353-6470
Penelope L. Peterson (517) 355-1737

Mission

The Center for the Learning and Teaching of Elementary Subjects will identify exemplary practices, particularly for teaching and learning problem-solving and higher-order thinking; develop and test hypotheses through school-based research; and make specific recommendations for improvement of school policies, instructional materials, assessment procedures, and teaching practices. The Center focuses on the issues of (a) what content should be taught, (b) how teachers frame and focus their teaching to best utilize their resources, and (c) in what ways good teaching is subject matter-specific. The Center will address these issues as they relate to five elementary education subject areas.

Programs of Research

Ideal Curriculum, Instruction,
and Assessment Practices in
Elementary Content Areas

Integrated Studies of Current
Practice

Improvement of Existing Practice

Principal Investigators

Jere Brophy

Penelope Peterson

Jere Brophy and
Penelope Peterson

OERI Center Liaison: John Taylor
Office of Research
Learning and Instruction Division
(202) 357-6021

Research Focus

This relatively new Center is conducting in-depth research and development studies on elementary-level (Grade K-6) teaching of mathematics, science, social studies, literature, and the arts, with particular emphasis on the teaching of higher level thinking and problem solving in each content area. The research will be

conducted in three phases using a unified approach. (a) applies a common set of data collection strategies to address a set of research questions studied in both public and private schools in each content area in each grade level; (b) addresses curriculum, instruction, and evaluation simultaneously and considers how they interact; (c) addresses both the intended curriculum (as envisioned by disciplinary experts, professional organizations, state and local education agencies, curriculum designers, and most directly classroom teachers) and the enacted curriculum (as developed through teacher-student interaction in the classroom and as interpreted by individual students); and (d) addresses sequencing of content across grade levels and integration of instruction across subject matter areas in addition to issues involved in teaching within grade level and subject matter.

Phase I-deals with literature review and solicitation of expert opinion concerning the nature and measurement of higher level thinking and problem solving and the ways in which these outcomes should be incorporated into elementary instruction in the various content areas.

Phase I-Study 1 involves analysis and synthesis of expert opinion on higher order thinking and problem-solving in the elementary school years. (Ralph Putnam, coordinator)

Phase I-Study 2 involves discipline-based reviews describing historical developments and current thinking in each of several disciplines concerning what ought to be included in the elementary school curriculum. (Jere Brophy, coordinator)

Phase I-Study 3 involves panels of experts (university-based curriculum and instruction professors who are national leaders in the field and elementary teachers who have been recommended as outstanding practitioners) critiquing popularly used curriculum materials and suggesting improvements. (Richard Prawat, coordinator)

Phase II work consists of a set of complementary studies to describe the intended and enacted curricula currently being pursued in each of the content areas for elementary grades K-6. The design for these studies includes 6 school districts, 36 schools, and more than 125 teachers.

Phase II-Study 1 involves examining intended curriculum as described in policy statements by professional subject organizations, by state departments of education, and by local school boards concerning content, instruction, and assessment. (Donald Freeman, coordinator)

Phase II-Study 2 involves studying commonly used and distinctive curriculum materials and assessment instruments in each of the

subject matter areas to define clearly the kinds of problem solving and higher level thinking that might be addressed in each content area. (Cheryl Rosaen, coordinator)

Phase II-Study 3 involves examining the intended and enacted curriculum of classroom teachers through questionnaires and interviews. The amount of emphasis that teachers give to subject matter domains will be described, along with information about provisions for teaching each subject for conceptual understanding and higher order applications. (Ralph Putnam & Penelope Peterson, coordinators)

Publications

Books and Articles

Alberty, Elsie J., and Wanda T. May. 1987. "Curriculum: Then and Now." Theory Into Practice [Special Issue: Educational Perspectives: Then and Now] 2 6:319-23.

Carpenter, Thomas P., and Penelope L. Peterson. (Eds). 1988. "Learning Mathematics from Instruction." Educational Psychologist [Special Issue] 2 3:77-197.

Cianciolo, Patricia. 1987. "Developing the Beginning Reading Process with Picture Books." Journal of Library Services for Youth 1 (1):47-56.

Leinhardt, Gaea, and Ralph Putnam. 1987. "The Skill of Learning from Classroom Lessons." American Educational Research Journal 2 4:557-87.

Peterson, Penelope L. 1988. "Teaching for Higher-Order Thinking in Mathematics: The Challenge for the Next Decade." Pp. 2-26 in Perspectives on Research on Effective Mathematics Teaching, edited by D.A. Grouws and T.J. Cooney. Hillsdale, NJ: Erlbaum.

Porter, Andrew C., and Jere Brophy. 1988. "Synthesis of Research on Teaching: Insights from the Work of the Institute for Research on Teaching." Educational Leadership 4 5(8):74-86.

Putnam, Ralph T. 1987. "Mathematics Knowledge for Understanding and Problem Solving." International Journal of Educational Research 11:687-705.

Swing, Susan, and Penelope L. Peterson. 1988. "Elaborative and Integrative Thought Processes in Mathematics Learning." Journal of Educational Psychology 80:54-64.

Swing, Susan, Karen Stoiber, and Penelope L. Peterson. 1988. Thinking Skills versus Learning Time: Effects of Alternative Classroom-Based Interventions on Students' Mathematics Problem Solving. Cognition and Instruction 5 :123-191.

Center Publications

Blair, David. In press. On Mathematicians in Curriculum Reform in Elementary Mathematics.

Brophy, Jere. 1988. Teaching for Conceptual Understanding and Higher Order Applications of Social Studies (Elementary Subjects Series No. 3).

Cianciolo, Patricia. 1988. Teaching Critical Thinking Through the Use of Children's Literature.

Erbes, Robert. In press. Elementary General Music: A Discipline-Based Review.

Johnsen, William. In press. The Study of Literature as a Systematic Disciplinary Practice.

Putnam, Ralph, Magdalene Lampert, and Penelope L. Peterson. In press. Higher Order Thinking and Understanding in Elementary Mathematics: Alternative Perspectives.

Levine, Peter, and Peter Berg. 1988. History in the Elementary School Classroom (Elementary Subjects Series No. 2).

May, Wanda. 1988. Critical Thinking in Art and Music.

Prawat, Richard S. 1988. Promoting Access: The Role of Organization and Awareness Factors (Elementary Subjects Series No. 1).

Putnam, Ralph. Forthcoming. Thinking and Understanding in Elementary Schools: Perspectives on Subject Matter Learning.

Rosaen, Cheryl. 1988. Interventions to Teach Thinking Skills: Investigating the Question of Transfer.

Roth, Kathleen. In press. Conceptual Understanding and Higher Order Thinking in the Elementary Science Curriculum: Three Perspectives.

Publication: may be ordered by writing to:

Center for Learning and Teaching of Elementary Subjects
252 Erickson Hall
College of Education
Michigan State University
East Lansing, MI 48824-1034

CENTER FOR THE LEARNING AND TEACHING OF LITERATURE

State University of New York at Albany
School of Education
1400 Washington Avenue
Albany, NY 12222
(518) 442-5026

Director: Arthur N. Applebee

Co-Directors: Judith A. Langer
Alan C. Purves

Mission

The mission of the Center for the Learning and Teaching of Literature is to provide an intellectual focus for literature research and practice; to conduct research that will contribute to the improvement of teaching and learning; and to act as a clearinghouse that promotes good practice in the teaching of literature. The Center is exploring fundamental issues in the literature curriculum which have the potential for improving classroom practice. To achieve this, the Center is examining the content and organization of the literature curriculum, processes of teaching and learning in literature classrooms, and the assessment of student performance. The research findings will be applicable to grades K-12 in both public and private schools.

Programs of Research

Principal Investigators

Current Emphases in Curriculum
and Instruction

Arthur Applebee
Sean Walmsley

Teaching and Learning Processes

Judith Langer
Lil Brannon
James Marshall

Assessment

Alan Purves
Peter Johnston

OERI Center Liaison: Rita R. Foy
Office of Research
Learning and Instruction Division
(202) 357-6021

Research Focus

The research of this relatively new center falls into three major areas: 1) surveys of current practice in the teaching of

literature, including studies of both what is taught and how it is taught, 2) studies of alternative approaches to instruction and their effects on students' knowledge of literature and critical thinking abilities, and 3) studies of alternative approaches to the assessment of literature achievement, including both classroom-based and larger-scale approaches to testing. Each program area is directed by its own panel of teachers and scholars.

Research on Current Emphases in Instruction. The first step in the improvement of the learning and teaching of literature is to develop a comprehensive description of current practice: what is being taught, to whom, using what methods. Four Center projects are designed to provide this information: 1) a national study of the teaching of literature in the secondary school, 2) a national survey of major works taught in grades 7 through 12, 3) an analysis of the most frequently used literature anthologies, and 4) a study of elementary school precursors to secondary school literature instruction.

Teaching and Learning Processes. What skills and understandings do students develop in the study of literature? How can teachers best encourage the development of content knowledge and critical thinking skills? The projects in this strand will provide a context for understanding alternative approaches to the learning and teaching of literature. One study in this strand is examining the kinds of thinking junior and senior high school students engage in when they read short stories, poems, and expository passages. A second study focuses on literature instruction. A team of teachers and university-based researchers are examining the effects of alternative approaches to literature instruction on students' thinking strategies. A third study focuses specifically on classroom interaction, using videotapes of individual lessons as a means to analyze discussion processes and to provide effective models of alternative instructional techniques.

Assessment. One of the most effective strategies in the current educational reform movement has been to use large-scale testing to drive changes in curriculum. Testing of literature achievement, however, has remained largely untouched, partly because the domain has been poorly mapped and partly because of debates about the usefulness of literature. Studies in this strand will: 1) provide a comprehensive map of the domain of literary knowledge and of instruments available to test the domain, 2) examine the interrelationships among alternative measures and the usefulness of the information provided, and 3) develop classroom-based alternatives to large-scale assessment.

NATIONAL ARTS EDUCATION RESEARCH CENTER

New York University
School of Education, Health,
Nursing, and Arts Profession
32 Washington Place, #31
New York, New York 10003
(212) 998-5050

University of Illinois
at Urbana-Champaign
College of Applied and Fine Arts
105 Davenport House
809 South Wright Street
Champaign, Illinois 61820-6219
(217) 333-2186

Directors: Jerrold E. Ross (New York University)
Theodore Zernich (University of Illinois)

The Arts Education Research Center is jointly funded by the National Endowment for the Arts (NEA) and the Office of Educational Research and Improvement (OERI). The NEA will administer and monitor the Center. The Arts Education Research Center will have two locations: New York University and the University of Illinois, Urbana-Champaign.

Mission

The New York University (NYU) Arts Education Research Center's mission is to conduct research that uses both qualitative and quantitative methodologies to study the following four areas that have direct impact on the teaching of arts: (1) the nature of aesthetic response, (2) skill development in the arts, (3) acquisition of historical knowledge about the arts, and (4) enhancement of critical thinking abilities. Superimposed on these are issues concerning multicultural education, interrelated arts, and interdisciplinary studies. The first and second years of research will focus on art and music at the secondary school level in urban, rural, and suburban areas. Year three will study theater, also at the secondary level. The NYU Arts Center's primary objective is to identify and/or create models of excellence in teaching the arts, demonstrate how and why these models work, and disseminate the results of such research so that the models may be replicable in public and private schools across the nation.

The University of Illinois (UI) Arts Education Research Center is dedicated to developing a deeper understanding of the complex issues surrounding teaching, learning, and evaluation in the arts at the elementary and secondary levels. The principal mission is

to provide national leadership in three related areas: (1) conducting research that is germane to schools and schooling and that assesses the acquisition of knowledge and skills in the arts; (2) conducting research related to teaching and learning in the arts in elementary and secondary school settings; and (3) providing leadership for the arts teaching profession by disseminating information and organizing collaborative exchanges.

These institutions will coordinate their research agendas and collaborate on research activities and findings. The activities of the Center will be overseen by a single National Advisory Panel.

Programs of Research

Principal Investigators

New York University

Processes of Successful Teaching
and Curriculum Development
in Arts Education

Jerrold E. Ross
Ellyn Berk

David Ecker
Margot Ely
Robert Landy
Francine Shuchat-Shaw
Sharon Weinberg

Teacher-Members of
the Center

Videotape Documentation of
Successful Teaching in

Same as above

Educational Relationships Among
the Schools and Cultural
Institutions

Jerrold Ross
Ellyn Berk

University of Illinois

Development and Validation of
Standardized Achievement Test
in the Area of Artistic
Processes and Techniques
in Art History

George Hardiman

National Study on Literacy
and Art Education

Ralph Smith

Role of Music in General
Education

Harry S. Broudy

Status Surveys in Art, Visual, Dance and Drama in the Elementary and Secondary Schools	Burnet Hobgood George Hardiman Patricia Knowles
Drama/Theatre Visual Dance	Burnet Hobgood George Hardiman Patricia Knowles
Influence of Culture Condition on the Learning of Arts	Brent Wilson
Development of Computer Assisted Testing (Music Education)	David Peters
Design of Studies in Dance	Patricia Knowles
Designs of Studies in Theatre	Burnet Hobgood
Status Survey of Music Educa- tion in Elementary and Secondary Schools	Richard Colwell
Motivation in Music	Martin Maehr
Arts Education Field Work: Observational Studies	Robert Stake

Center Liaisons:

NEA Center Liaison: Warren B. Newman
National Endowment for the Arts
(202) 682-5400

CERI Center Liaisons: Norma Lindsay
Office of Research
Learning and Instruction Division
(202) 357-6021

Research Focus

This relatively new center will undertake a program of research and dissemination to further efforts of the National Endowment for the Arts and the U.S. Department of Education in advancing teaching and learning in the arts in grades K-12. More specifically, the Arts Education Research Center will conduct directly or contract other institutions to carry out a program of research and dissemination in arts education. The main purposes

of the Arts Education Research Center are to identify and/or create models of excellence in teaching the arts, demonstrate how and why the arts work, and disseminate the results of such research so that the models may be replicated across the nation.

The center will develop models suitable to secondary schools in urban, suburban, and rural settings, and, may also develop models suitable to the elementary school level in the aforementioned demographic settings.

NATIONAL CENTER FOR RESEARCH IN MATHEMATICAL SCIENCES EDUCATION

Wisconsin Center for Education Research
University of Wisconsin at Madison
1025 West Johnson Street
Madison, Wisconsin 53706
(608) 263-4285

Director: Thomas A. Romberg

Mission

The National Center for Research in Mathematical Sciences Education has a research program that seeks to provide a research base for the reform movement in school mathematics. NCRMSE is addressing the integration of knowledge about teaching and learning mathematics, the relationship between mathematics content matter and the curriculum, and mathematics assessment. The activities focus on two areas: Instruction/Learning and Curriculum/Assessment. The programmatic research design addresses (1) how to build relationships between research on students' cognition and problem-solving ability and research on instruction in the content specific areas of Early Arithmetic, Algebra, Geometry, and Rational Numbers; and (2) how to build a relationship between current efforts to reform the school mathematics curriculum and the procedures and techniques of assessing student achievement in mathematics as a result of studying the curriculum. The latter relationship is examining the nature of the current curriculum reform movement, the state of current practice and the problem of curriculum alignment, and the influence of assessment in the curriculum.

Programs of Research

Learning and Instruction of
Algebra, Early Arithmetic,
Geometry, and Rational Numbers

Mathematics Curriculum and
Assessment of Mathematics Study

Principal Investigators

Elizabeth Fennema
Thomas Carpenter

Thomas Romberg

Research Affiliates

Harriett Behout, University of Cincinnati
Joanne Becker, San Jose State University
Merlyn Behr, Northern Illinois University
Don Bernard, University of Florida
Catherine Brown, Virginia Polytechnic Institute
David Clarke, Institute of Catholic Education
Debra Clithro, Springfield, Missouri, Schools
Paul Cobb, Purdue University

Jan deLange, Rijksuniversiteit Utrecht, Holland
 Karen Fuson, Northwestern University
 Douglas Grouws, University of Missouri
 John Harvey, University of Wisconsin-Madison
 James Kaput, Southeastern Massachusetts University
 Mary Koehler, San Diego State University
 Magdalene Lampert, Michigan State University
 Carolyn Maher, Rutgers University
 Douglas McLeod, Washington State University
 Barbara Pence, San Jose State University
 Thomas Post, University of Minnesota
 Sidney Rachlin, University of Hawaii
 Leslie Salmon-Cox, University of Pittsburgh
 Tom Schroeder, University of British Columbia
 Walter Secada, University of Wisconsin-Madison
 Sharon Senk, University of Chicago
 Paul Smithdale, University of Pittsburgh

OERI Center Liaison: Steven Kirsner
 Office of Research
 Learning and Instruction Division
 (202) 357-6032

Research Focus

The Learning/Instruction Project is studying how knowledge from cognitive and instructional sciences can be integrated to design more effective instruction in mathematics. Researchers are focusing on three basic questions: (1) How can research in students' cognition be applied to problems of classroom instruction; (2) What kinds of knowledge about students' thinking and problem solving is most useful for addressing problems of instruction; and (3) Can models for studying classroom instruction be developed that are consistent with what we know about individual students' learning and problem solving? Early in 1988, a conference was held at which groups of researchers were established to work on these problems in the areas of arithmetic, rational numbers, algebra, and geometry.

The Curriculum/Assessment Project is examining current efforts to reform the school mathematics curriculum and the procedures and techniques of assessing student achievement related to that reformed curriculum. This project is employing a number of research techniques to help gain insights to such questions as: What fundamental knowledge should be taught to students? How should the school mathematics curriculum be organized and sequenced? How should new technology (e.g. calculators, computers) be incorporated into the mathematics curriculum? How should the relationships between mathematics and other subjects be incorporated into the curriculum? How does the current

intended curriculum as prescribed by the state, the district, the school, or the teacher differ from concepts of an ideal curriculum? How does what is actually taught differ from both the current intended curriculum and an ideal curriculum? What content areas are most in need of change? What is the relationship between what is actually taught, what is intended, and what is ideal, on the one hand, and what is tested, on the other? Do tests provide valid information on student achievement, especially in areas such as problem solving, higher order thinking, applications? How? Why? What are alternative ways of getting valid information on student achievement? Do tests influence curricular changes or teaching practices? How? Do tests influence learning? How? How can the information derived from answering the previous questions be used to help prepare effective curriculum materials such as textbooks, computer software and tests?

Publications

Monograph

Fennema, E., Carpenter, T., & Lamon, S. (Eds.) 1988). Integrating Research on Teaching and Learning Mathematics. Proceedings of the First Wisconsin Symposium for Research on Teaching and Learning Mathematics, Madison, Wisconsin.

Research Report

Romberg, T. A., Zarinnia, E. A., & Williams, S. (December 1988). The Influence of Mandated Testing on Mathematics Instruction: Grade 8 Teachers' Perceptions. Madison, WI: National Center for Research in Mathematical Science Education, University of Wisconsin.

Occasional Papers

Romberg, T. A. (November, 1987). The Domain Knowledge Strategy for Mathematical Assessment. Project Paper #1, National Center for Research in Mathematical Sciences Education, University of Wisconsin, Madison.

Publications may be obtained by writing to:

National Center for Education Research
University of Wisconsin at Madison
1025 West Johnson Street
Madison, Wisconsin 53706

THE NATIONAL CENTER FOR IMPROVING SCIENCE EDUCATION

The NETWORK, Inc.
1920 L Street, NW, Suite 202
Washington, DC 20036
(202) 467-0652

Director: Senta Raizen

The NETWORK, Inc.
290 S. Main Street
Andover, MA 01810
(508) 470-1080

Associate Director: Susan Loucks-Horsley

Affiliated Institution: Biological Sciences Curriculum Study
(BSCS)

Mission

The National Center for Improving Science Education will provide conceptual and practical leadership across areas of major interest in science education, by promoting changes in state and local education agency policies and practices that affect science assessment, curriculum, and teaching. In doing so, the Center will serve as a mechanism to bridge gaps between research and practice in science education by synthesizing what is known from current research and practice. The Center's research agenda is comprised of a series of integrative studies that will enable it to (1) understand the current status of science curriculum, assessment, and teaching; (2) enhance, link and integrate current efforts to establish what ought to be the future of science education; and (3) create products and processes that will help science education progress towards this new vision. The Biological Sciences Curriculum Study (BSCS) is a partner in carrying out the mission and activities of the Center.

Programs of Research

Science Assessment

Science Curriculum and
Instruction

Science Teachers and
Teaching

Principal Investigators

Senta Raizen

Rodger Bybee

Susan Loucks-Horsley

OERI Center Liaison: Wanda Chambers
Office of Research
Learning and Instruction Division
(202) 357-6021

Research Focus

This relatively new center is conducting two major strands of research: (1) research synthesis studies, and (2) small-scale feasibility studies. Each of the three years will focus on a different level of schooling, beginning with the elementary school, then the middle grades, and finally the high school. The first strand of research is a set of synthesis studies of science education research and practice in the areas of (a) science assessment, (b) science curriculum and instruction, and (c) science teachers and teaching. The first project in this series of studies focuses on what science skills and knowledge are being assessed, which ones should be assessed, and how. The second study updates our understanding of what is currently being taught in schools and how, and proposes a curriculum framework and instructional model drawn from research and practice that could form the foundation for science teaching. The third project considers the knowledge and skills of science teachers and how their preparation, staff development opportunities, and school and district structures and facilities support their teaching of science.

Each year the Center conducts a series of feasibility studies, small-scale studies of topics identified as gaps by the synthesis studies, that relate to the three program strands. In Year 1 the first study focuses on the kind of tests teachers construct to assess their students' science learning, and what use they make of the information collected. The second study explores the needs that teachers and school administrators would have should they desire to implement a new vision of science education, as represented by the curriculum framework and the instructional model resulting from the curriculum and instruction project. This study also explores the role of the state education agency and district office in meeting those needs. A third feasibility study is developing "case stories" of successful implementation of key components of the curriculum framework and instructional model, examining the factors that inhibit and those that support use of such innovative approaches. In subsequent years, different feasibility studies will be conducted, depending on gaps identified by the synthesis studies.

Publications

Reports of three synthesis studies of elementary school (1) science assessment, (2) science curriculum and instruction, and (3) science teachers and teaching. Available January 1, 1989.

Integrated report on elementary school science education. Available February 1, 1989.

Implementation guides for improving science education in elementary schools for (1) local educators, including district and building administrators, and (2) state-level educators, including state science supervisors and education commissioners. Available March 1, 1989.

Guidelines for improving science education in elementary schools for specific groups such as teachers, parents, school boards, teacher educators, and scientists.

Similar publications will be available in succeeding years for the middle grades (early in 1990) and high school (early in 1991).

Publications will be available through the Center's Andover office.

United States
Department of Education
Washington, D.C. 20208-5573

Official Business
Penalty for Private Use, \$300



POSTAGE AND FEES PAID
U.S. DEPARTMENT OF EDUCATION
ED 395
FOURTH CLASS BOOK RATE



OR 89-561